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BRITISH ASSOCIATION.

In our last Number we gave an account of the preliminary steps which had led to the opening of this year's meeting, with every prospect of an interesting result; and since then, every thing has contributed to realise the anticipation.

The royal recognition of the Society by the grant of the Observatory at Kew, giving it a local British habitation, as it had previously wrought for itself an European and Transatlantic name, is a great point in favour of its stability, permanency, nationality, and prosperity.

The eloquent speech of the President, Lord Francis Egerton, on assuming the chair, is another circumstance very auspicious for the Association—first, by its admirable exposition of their objects and their importance to mankind; and next, by its allying them more and more closely with the aristocratic ranks of the country, as here represented by a nobleman highly distinguished by his taste for the fine arts, his love of literature, and his own genius.

The well-toned and also eloquent address of his Excellency the American Minister, Mr. Everett, at the grand dinner on Saturday, is a third feature of considerable consequence; and followed out as it was in spirit by M. Bessel, M. Jacobi, and other citizens of various continental states (speaking, as may be presumed, the sentiments of Austria, Russia, Prussia, Germany, Italy, Switzerland, &c.,*) it afforded a gratifying proof of the fact that these *réunions* of science are not a little calculated to improve international feelings, and contribute to the peace and happiness of the world. When Intellectual Pursuits have but one country, the baser passions must be kept more under subjection, and the jealousies which are but too apt to disturb the earth be greatly modified, if not entirely extinguished. And if these manifestations were not enough to vindicate the beneficial purposes, demonstrate the powerful influences, and exalt the proud name of the British Association, we would only further refer to the speech of Prof. Sedgwick, on the same occasion,—admirable in language, brilliant in delivery, of universal application, and nobly enforcing every just principle and philanthropic practice of humanity, morality, and religion.

With these few observations we proceed to our historical task of reporting the proceedings, merely remarking that these also have at this meeting been of an order to do honour to the Association, as the enlightened exponent of the condition of science, and promoter of discoveries of the utmost value to the human race.

Magnetic and Meteorological Co-operation.

[This report, by Sir J. Herschel and Col. Sabine, was read on Tuesday morning in Section A.; but its interest and importance will be not only our excuse, but our guerdon, for taking it out of its routine and placing it here. In our abstract we are sure that nothing is omitted, or "come tardy off:" and we may say it is all the scientific world can learn from these high authorities on the subject.—*Ed. L. G.*]

The Committee have great pleasure in being enabled to continue their hitherto favourable report of the progress of the important operations which they have been delegated to watch over. The extent of operations is now vastly increased, by new foreign establishments observing upon the same concerted plan and at the same hours—by the adoption of a system of colonial and national magnetic surveys based upon, and correlative with, the fundamental determinations at the fixed magnetic centres—and by the introduction of new instruments and processes of observation, affording great facilities for magnetic determinations to travellers both by land and by sea. The report was subdivided into several distinct sections.

1. *The Antarctic Expedition.*

Last year's report brought down the progress of the expedition to its departure from Hobart Town in Nov. 1840. The published extracts from the despatch of Capt. Ross, dated April 7, 1841, containing the details of the brilliant success of the expedition in penetrating the barrier of ice, &c., must be too fresh in recollection to need any recapitulation. It is with the magnetic observations and results of this voyage only that our immediate concern lies. Landing on the Auckland Islands shortly after leaving Hobart Town, Capt. Ross observed there the November term of 1840. Abandoning then, by reason of the ill success of his predecessors in that direction, his original intention of sailing across the isodynamic oval surrounding the points of maximum intensity, his adopted course led him between the two southern foci. And although his return to the northward was by a more westerly route, it seems probable that he was still to the eastward of the present locality of the greatest intensity. The magnetic observations accumulated in this voyage have only lately reached England. Their full import cannot yet be known; but it is understood that intensities have been observed by Capt. Ross in these regions exceeding 2½ times the minimum observed by him near St. Helena in the outward passage; and that the general aspect of the intensity-observations would appear to place the centre of the principal isodynamic oval in a latitude somewhat exceeding 50° S. The intensity in lat. 76°, where the nearest approach was made to the magnetic pole, was found to be actually less than in 47° S. The nearest approach to that interesting point, viz. the magnetic pole, was made in lat. 76° 12′, long. 164° E.,—the dip being 88° 40′.

It was mentioned in the last report, that the publication of the magnetic observations of the expedition had, at the request of the Admiralty, been placed under the superintendence of Lieut.-Col. Sabine. The first portion of this work has been published in the Philosophical Transactions of the present year, containing the observations of intensity made at sea between England and Kerguelen's Land. In this paper, the 3d of a series of "Contributions to Terrestrial Magnetism," which were stated to be due to Col. Sabine's zeal and industry—the whole series of intensity-observations made on board each of the ships with Fox's statical deflecting magnetometer, are carefully analysed, projected, and reasoned on. The results are every way most satisfactory as regards the probability of observing with precision at sea, in all sorts of weather—as a proof of which it will be necessary only to mention, that out of 647 observations of this kind, made between London and the Cape, on board the Erebus, one only was found so far irreconcilable with their general tenor as to be described doubtful: while the observations taken on board both ships, when compared, exhibit a steady accordance which cannot be accidental, and may well be termed beautiful. From this examination it would appear (if earlier observations can be relied on), that the line of least intensity on successive meridians is travelling northwards.

In addition to the sea-observations, the expedition, since the last report, has made absolute determinations, and observed terms, as follow:—

1840. Nov.	Auckland Island.
1841. May and June	Van Dieman's Land.
„ July	Sydney.
„ Aug. Sept. Oct. Nov. .	New Zealand.

The November term having been kept in the Bay of Islands, the expedition, according to the last letter received from Capt. Ross, dated Nov. 22, 1841, was to sail thence the day following, to resume the exploration of the Antarctic regions. His intention, as stated in that letter, was to traverse the isodynamic oval surrounding the forms of greatest intensity, supposed to be in lat. 60°, long. 235° E.; commencing in long. 210°, lat. 52° or 53° S., and, steering thence directly south to the edge of the ice-pack, make, in reaching it, for the point at which the first year's exploration of the coast of the new continent terminated, with intention to pursue the barrier, wherever its course may lead. The working out of this arduous undertaking may of course involve a winter spent within the Antarctic circle. Should it be otherwise, we may expect shortly to hear of the arrival of the expedition at the Cape or at the Falkland Islands; but in the event of that tremendous alternative, another year at least must elapse without the possibility of any accounts being received.

2. *British and Foreign Observatories. Extension of the period for which the British Establishments have been granted by Government for a fresh period of equal duration.*—All the British and Indian magnetic observatories, except that at Aden, as well as the continental ones which can be regarded as intimately connected with and bearing part in the great operations in progress, are, of course, and have long been, in full activity. The Russian Government has been pre-eminently active in the establishment of new observatories; and supported by the powerful protection of M. Le Conte Cancerine, the minister of finance, as well as aided by funds placed at his disposal for the purpose by Mentchikoff and other Russian noblemen of distinction, the zealous and energetic director-general of the Russian observatories, M. Kupffer, has succeeded in procuring the establishment, and bringing, by his personal exertions, into a state of efficient activity, magnetic observations at Kasan, Bamaoul, Nertschinsk, and Catherinebourg, obtaining the re-erection of the old and inefficient observatories of Ti-

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* It is rather remarkable that this year not one French savant of eminent rank attended the meeting; though on former occasions such individuals were welcomed with almost enthusiasm.—*Ed. Lit. Gaz.*

flis and Nicolayeff, and the prospect of a foundation for the same purposes at Moscow, under the auspices of Count Strogonoff, curator of that city.

The vast development of the original plan of operations, followed up as it has been by almost every European power, has of course not been accomplished without the lapse of much valuable *time*, consumed in the necessary preparations—the instruction of officers, their conveyance to their ports of destination, erection of observatories and establishments, and adjustment of instruments. The original term of observations granted by her Majesty's Government and the East India Company, was three years, which expire in the current year, just when, in fact, every thing is come into full action, and the fruits of so much labour and expense are beginning to be regularly gathered in. Application, however, has been made for the continuance of the observations to the end of the year 1845; and, at the same time, it was officially intimated on the part of the Russian Government, that the Russian observatories should be kept on as long as the British. To the representations made, an unhesitating assent on the part of the British Government has been given; and, in consequence, the continuance of the general system for three additional years must be considered secure. Although what has been done may be considered preparatory to what is to follow, yet its actual independent value should not be overlooked. Were it only on account of its affording so vast a basis of comparison with the itinerant results of the Antarctic expedition, it would have been inestimable. The demonstration it has afforded of the ubiquity over the whole globe of those singular disturbances (see *L. Gaz.* No. 1303) to which the name of magnetic stones has been applied, could have been no otherwise obtained, and is in itself a physical result of the first importance. The data it has afforded for the revision of the Gaussian theory are numerous, and beyond all comparison more exact than any which had ever before been collected. In short, the operation hitherto has been conspicuously successful.

3. Magnetic Surveys: *Southern Africa.*—Lieut. Clark, and one additional gunner, have joined Capt. Wilmot and the magnetic establishment at the Cape. It is proposed that the survey shall comprehend, in addition to the colony itself, as extensive a portion of the earth's surface in all directions from the observatory as time and circumstances will permit. Application has been made to the Admiralty to permit the sea-portion of this survey to be carried into execution by occasional opportunities which the admiral at the Cape station may be able to afford in her Majesty's ships and vessels under his command. This will include the coasts of Africa on either side of the Cape. The expediency of completing the circle by an excursion into the interior will be taken into consideration. Already have inquiries been set on foot as to necessary provisoes for and circumstances of such excursion. The Geographical Society have also furnished notices of high interest as to the points of geographical discovery which might be accomplished, including the Great Lake in the interior of South Africa, which has never yet been visited by any European.

North America.—Lieut. Lefroy has been appointed to succeed Lieut. Riddell as principal director of the observatory at Toronto, and will proceed to America in a few weeks. Since Lieut. Riddell's return to England, in January 1841, on account of health, the observatory at Toronto has been conducted in the most satisfactory manner by Lieut. Younghusband, on the excellent system established there by Mr. Riddell. The Hudson's Bay Company, with its accustomed readiness to promote scientific inquiries of all kinds in their extensive territories, have most liberally undertaken to furnish conveyance in the summers of 1843, 44, 45, over the countries of the north and west of Canada, extending to the shores of Hudson's Bay and to the Pacific Ocean, and have made the farther offer of a passage in one of their annual ships from Hudson's Bay to England, so as to include in the survey the interesting magnetic region of Hudson's Bay and Straits. The operations thus contemplated in the north will connect themselves with magnetic surveys actually in progress by several distinguished magneticians in the United States. Mr. Bache has, during the last summer, completed the systematic survey of Pennsylvania, including the three elements of declination, inclination, and intensity. Prof. Loomis has extended his series of observations of inclination over many parts of the States of Ohio, Indiana, Illinois, and Missouri. M. Nicollet has also observed in the same region, and Dr. Lacke has added a contribution. These and other similar observations expected from the interest excited through the United States by magnetism, will connect the northern British survey with the determinations of Capt. Barnett, R.N., commanding H.M.S. Thunder, on the southern coasts of the United States, in the Gulf of Mexico. Capt. Barnett is well provided with instruments both for sea and land observations, and has shewn himself a zealous and careful observer.

4. *Observations made at Sea.*—To extend and facilitate the use of Mr. Fox's valuable instrument, a set of instructions for its use has been drawn up by Col. Sabine, and furnished by the Admiralty for general circulation. The use of this instrument has been adopted, and the same system of daily observation practised with it as in the Erebus and Terror, by Capt. Blackwood in his surveying expedition to Torres Straits; and the example, it is to be hoped, will be followed, not only in voyages designed expressly for purposes of discovery and exploration, but in ships pursuing ordinary tracks, so as at length to furnish data for the construction of complete magnetic sea-charts, founded on observations alone for the important elements, inclination and intensity, as well as for the declination. Care is enjoined with regard to climate, the influence of iron in ships in which such observations may be made; and reference is given to instructions for this purpose, as regards the declination, issued by the Admiralty, and substantially the same with those given by Col. Sabine in his paper on the compass-deviations on board the Isabella and Alexander in the Arctic voyage of 1818. The value of the series of Captain Belcher's (R.N., H.M.S. Sulphur) magnetic determinations was acknowledged. The first portion of them has been reduced by Col. Sabine, and published in the *Phil. Trans.* for 1841. The determinations have been continued in the islands and coasts of the Pacific and China seas. The observations have arrived in England, and will shortly be reduced; forming altogether a valuable contribution towards the data accumulating for the revision of the numerical elements of Gauss's theory. The final publication, during the last year, of Professor Erman's magnetic results in his journey into Siberia and voyage round the world, was also signalised.

5. *Magnetic Disturbances.*—M. Gauss truly remarks, that "it is one of the great results of British enterprise, that the existence of disturbances extending over the whole globe has been ascertained" (for account of this, see *Lit. Gaz.* No. 1303). As a physical fact, deeply connected with the general causes of terrestrial magnetism, this is indeed of the first magnitude; and its consideration, under all its circumstances, and especially as modified by distance and geographical locality, is eminently calculated to lead to speculations on those causes, and to theoretical views tending to connect these abrupt variations with the usual course of the magnetic phenomena. To disconnect, in the phenomena of these magnetic storms, what is local from what is general, and to trace individual shocks occurring in them from observatory to observatory, and from station to station, until they become so far enfeebled by the effects of distance from their origin, as to be confounded and marked by the growing influence of other shocks whose point of action is nearer,—is now one of the principal points to which attention must be directed. The occurrence of many and remarkable storms during the continuance of these observations, at the most distant localities, and with all their detail of circumstances, has given a very high degree of immediate interest to this branch of the inquiry, and occasioned a change in the contemplated order of publication of the reports. It has been considered advisable to collect together, from all the returns, those cases of remarkable disturbances observed, arrange them in chronological order, and publish them in volumes by themselves. Those of 1840 and 1841 will appear in the course of the summer. Among those which will be included in this first publication, the great disturbance which occurred on and about 25th September 1841, though not the greatest in point of actual deviation which has occurred, is yet, in many respects, one of the most remarkable.

Anomalous magnetic movements of unusual magnitude take place, on the average, three or four times in the month, but apparently with greater frequency in some months than in others. And the returns from the different stations shew hitherto, without exception, that these disturbances are general; that is to say, that though the movements individually may not be, and in fact are not, always *simultaneous*, the observations of the same day never fail to exhibit unusual discordances at all the stations. Generally the disturbances are characterised by a diminution, more or less, of horizontal intensity, prevailing, more or less, for several hours together, every where; and mostly accompanied by a movement, also general, of the north end of the needle towards the west. Experience has somewhat diminished the value of the term as a *principal means of detecting disturbances*, especially since the observatories have adopted hourly observations, by which a departure from the normal state cannot continue long without notice; and thus it furnishes, of itself, all the stations with a natural signal for simultaneous and frequent observations. Besides at the Colonial and East India observatories, under the direction of the committee, the disturbances are watched with the greatest diligence at Prague, Munich, and Greenwich.

6. *New Magnetic Instruments and transportable Magnetometer.*—The great advantages afforded by the latter instrument were set forth. It has become, during the last year, a thoroughly practical one, and will multiply absolute determinations, term-observations, and disturbance-observations, far beyond what could ever be done by fixed observatories, and also in localities

where such could not be established. Already have these improved instruments and instructions for their use, together with formulæ of correction and reduction, drawn up by Mr. Riddell, been supplied to Capt. Blackwood's expedition to Torres Straits; and to Capt. Sullivan, proceeding to survey the Falkland Islands; also to Mr. Lefroy, to enable him to keep these terms in whatever parts of America he may find himself on the days appointed. Others are preparing for Capts. Barrett and Groves, R.N., who are engaged in surveys at Bermuda and Malta. From Capt. Allen, R.N., of the Niger Expedition, the November and December terms 1841, kept at Ascension, have been received; also determinations at the same island.

Professor Lloyd's new Inclinometer was especially adverted to. Prof. Lloyd calls it the inductive inclinometer. The principle of it is, the measurement of the intensity of the magnetism induced in a vertical bar of soft iron (which must be considered as due to the vertical magnetic component only), by the direction it is capable of causing in a horizontal bar suspended near it. The details of the construction and adjustment of this instrument are given in Prof. Lloyd's work, entitled *Account of the Magnetical Observatory at Dublin.*

Weber's Inductive Inclinometer and *M. Lamont's Inclinometer* were also described under this head.

7. *Publication of Magnetic Observations, Descriptions of Observations, &c.*—Under this head were noticed briefly the appearance of several works during the past year, and memoirs in which observations are recorded or discussed, instruments and observations described, &c. It must suffice here merely to name them. Observations made in Russia under the superintendence of M. Kupffer for the year 1839. 1st vol. of the Magnetic and Meteorological Observations made at Prague, by M. Kreil, from 1st July 1839 to 1st July 1840—Meteorological Observations on the solstitial and equinoctial Term-days, &c. by M. Quetelet, regularly published in the bulletins of the Royal Academy of Brussels—Descriptions of Magnetic Observations at Dublin, Munich, and at Harvard University, Cambridge, United States, respectively, under the directions of Dr. Lloyd, Dr. Lamont, and Messrs. Lovering and Bond. Dr. Lloyd's paper may be advantageously referred to for a full account of the construction, adjustments, and mathematical theory, of all the magnetic instruments employed, and in this respect must be considered as a very useful and valuable contribution to the cause in hand. Col. Sabine has reduced and discussed, during the past year, the observations of Capt. Belcher on the west coast of America and at Otaheite, in the second series of his "Contributions to Terrestrial Magnetism," published in the *Phil. Trans.* 1841; and in his third series has passed under examination the sea-observations of intensity made on board the Erebus and Terror on their voyage from England to Kerguelen's Land.

Prof. Loomis's observations of intensity and dip in several stations in the United States during the years 1838, 9, and 40, have also appeared in the year elapsed. Prof. Lloyd has resumed the subject of the mutual action of permanent magnets, in a supplement to his former paper on that subject, published by the Royal Irish Academy. A considerable extent of correspondence has taken place, embracing, amongst other matters, a variety of practical suggestions, to which opportunity for attention will be afforded.

SECTIONS.—THURSDAY.

SECTION A.—*Mathematical and Physical Science.*

1. Sir D. Brewster, "Report respecting the erection of one of Osler's Anemometers at Inverness."
2. Sir D. Brewster, "Report on hourly Meteorological Observations at Inverness, from 1st November 1840 to 1st November 1841."
3. Mr. J. S. Russell, "Supplemental Report on Abnormal Tide-wave in the Frith of Forth."
4. Mr. J. Dent, "On the rate of protected Chronometer-Springs."
5. Mr. J. Dent, "On the rate of the patent Compensating Pendulum."
6. Mr. J. Dent, "On the Longitude of Devonport."
7. Mr. J. Dent, "On a new Chronometer-Compensating Balance."

No. 1. From the erection of an anemometer at Inverness, situated at the northern extremity of the great glen of Scotland, interesting results were expected. Sir D. Brewster regretted that as yet they had not obtained the registration of a whole year; he explained the causes of this, and by reading extracts of a letter from Mr. Gray of Perth, under whose immediate charge the observations are being conducted, reported the progress made. The apparatus reached Inverness on the 26th March: in the course of April it was fitted up so far as to have two pencils, shewing the direction and force of the wind, in good action; the results of which since the 25th April, Mr. Gray's letter contained. The rain-receiver unfortunately broke at first, and Mr. Osler was not able to replace it till the 6th May; so that the indications of the rain-gauge had only just begun to be registered. Mr. Gray said he hoped, at the termination of the year commenced on the 1st May last, to be able to lay before the Association the complete registration of the whole year. The three pencils were now in complete operation, and they had no trouble with the working of the apparatus.

A conversation ensued arising from a remark by Prof. Stevelly, with reference to the working of the Osler anemometer at Plymouth, under the direction of Mr. Snow Harris and Mr. Cox. The latter had stated that the instrument there did not register the very light winds. Now Prof. Stevelly did not know whether that was the defect of that particular instrument, or one generally attaching to anemometers. Mr. F. Osler said that the anemometer erected at Plymouth was one of the earliest made, and those of more recent construction were much more sensitive; but still they would not register exceedingly weak currents; and he conceived that an instrument to record very heavy storms, and to bear the knocking about to which the wind-gauges were necessarily subjected, could not be made to register very light winds with accuracy; but he thought that another and a more delicate instrument might be made to register those light winds only, and not the heavy ones. He considered it impossible for the same instrument to do both duties.

Col. Sabine observed, that all the failures arose from this combination, and the endeavour to register by the single instrument both the light and heavy winds. If it were divided, all practical difficulties would be removed.

Mr. Scoresby hoped, that by another year Mr. Osler might be enabled to accomplish this, and supply the desideratum for the light currents.

No. 2. Sir D. Brewster's next report was of the same brief character, as he had only received the results very recently from Mr. Mackenzie at Inverness. The work itself was one of immense labour. 8760 observations had been made during the year, not only upon the thermometer, but also upon the barometer; they formed the results of the second series of hourly observations made at the expense of the British Association. When the two were compared with each other, they presented points of very great interest. The present series were made during 1841, embracing the winter, the spring, the summer, and the autumn months; not in succession, but comprising a full meteorological year. The mean temperature of the six winter months at Inverness was 40·28; of the six summer months, 52·26. The annual mean was 46·27. It was worthy of remark, that the difference of temperature was exceedingly trifling between the six summer and the six winter months; and it was curious how the functions of vegetation could be well performed with such a small increase of temperature. In assuming the particular results for each hour of the day, and arranging them, the mean daily curve of the temperature was obtained. This curve consisted of the mean ordinates for each hour; and, what was very singular (consisting as it did of an immense number of observations), the sum of these observations, however irregular in themselves, when placed in classes were in regular relation to each other, whether he took the observations made at Leith or at Kingussie, which was 800 feet above the level of the sea, or in the more northern latitude at Inverness. Sir D. Brewster then exhibited a diagram, which shewed the curves at these three places from morning to evening; and he said it was singular that the points of the curves representing morning and evening were all parabolas, and that the difference between them did not amount to more than a quarter of a degree of Fahrenheit. Another remarkable correspondence was, that the points where these curves cut the line of mean temperature were invariably distant 11 hours 15 minutes. This had been found the case with respect to observations at Edinburgh in four successive years; and M. de Humboldt had taken notes of these, and compared them with observations which he made at Parma and in some places in Germany; and he found the intervals in those observations to be exactly the same,—11¼ hours; to which he had given the name of "critical intervals." The mean temperature, according to the observations of last season, occurred at 8h. 33m. in the morning, and at 7h. 32m. in the afternoon; making an interval of 11h. 9m.; approaching so nearly to 11h. 15m., as before observed, that they might be considered as nearly identical. Mr. M'Kenzie's observations consisted also of those on the barometer; both the monthly and hourly averages of which had been reduced to the level of the sea, from the formula furnished by Dr. Anderson of Perth. Each of the 8760 hourly observations of the barometer had also been reduced to the standard of 60° Fahrenheit, according to Dr. Anderson's formula. Mr. M'Kenzie had drawn the hourly barometrical current, represented in a diagram so constructed as to expand them vertically. Sir D. Brewster exhibited the diagram, which shewed the line from midnight to midnight. Every one acquainted with the hourly variations of the barometer knew that their maximum was at the equator, and that there was a gradual decrease as we go north, so that it might have been expected that at Inverness it would be scarcely perceptible; but, owing to the number of observations being so great, it had become very perceptible. These observations, which had been made at the expense of the Association, at Kingussie, Plymouth, and Inverness, had afforded results of extreme value; and he would say, that if the Association had never done any thing else than

to set going these observations, it was highly deserving the countenance and patronage of the country. The first maximum (as shewn by the diagram) occurred at four o'clock in the afternoon, the second at three and four o'clock; so that the interval was about eleven hours and a half.

Prof. Phillips had been long anxious to know something of barometrical oscillations. He exhibited the difference of these results of observations so far north, and at such an altitude, with those of the low ground near London, pointed out the value of the series, and said that it was only necessary to continue these observations a little longer, so that they may be applied to the general theory of barometric oscillations.

The chairman said, although the results of these observations were exhibited in a very brief form, they were the results of long and serious labours; and if continued, he thought the results would be exceedingly important. This class of experiments had been extensively undertaken by the influence of the Association, and on a scale by which alone we could have any hopes of obtaining general laws in meteorology. It was impossible to draw any general conclusions from brief and imperfect observations made at long intervals; but the results of the investigations now in progress, not only by the Association, but also by the governments of this, and of almost every civilised country in Europe, would, he trusted, before long, develop the general laws of meteorology.

No. 3. Mr. J. S. Russell reported his recent operations in the Frith of Forth, the peculiarities of which, in respect of the tide-wave, were described at some length. They were the results of observations made at four different points every five minutes during the twenty-four hours. The results were very remarkable, and sufficiently prominent, even in the short period of observation, to leave no doubt as to the extraordinary phenomena which occurred there, in conformity with the theory of tides by Whewell and Lubbock, but varied by the form of the Frith. Mr. Russell went over some of the details of his former reports, which we need not repeat. The new points of the inquiry appeared to have reference to the diurnal inequality of the tides, and to the lateral diffusion and onward progress of the tidal wave. He said Prof. Whewell had first directed the attention of philosophers to the existence, magnitude, and variety of the phenomena of what was called the diurnal inequality of the tides,—the difference between two successive tides, morning and evening,—the phenomena of which were most extraordinary and anomalous. Mr. Whewell had said, that, in tracing the very extensive set of observations made by him in various parts of the world, and carried round the whole coast of Great Britain, (partly in consequence of grants from the Association), he had found, that the diurnal inequality presented very singular anomalies, appearing and disappearing in places adjacent to each other; and sometimes the inequality was very great on one side the channel and very small on the other, and sometimes it was very different at the same place at different epochs. It occurred to him (Mr. Russell), that if it were true (as he supposed) that these two tides were merely the tides propagated from different sides of the island, he should find, that, as in that case, one of them, when it arrived at Leith, must be nearly twelve hours older than the other, the one would be the evening tide, and the other a morning tide. Therefore it ought to follow, that, if we take the greater to be the normal, and the smaller to be the abnormal tide— (and he found that the greater was the normal, corresponding with the tide which came round the north of the island)—when he had greater inequality in the normal tide, he should have less inequality in the abnormal or southern tide, and *vice versâ*. And this happened to be precisely the case throughout. He had this discussed with regard to the inequality; and it turned out that this inequality was greater or less, and that the two increased and decreased in magnitude with the interval of the transit between them. This appeared to him perfectly to settle the question as to the existence of this second tide-wave. But he was much puzzled by the appearance of a high tide in the middle of low-water. This amazed him very much at first, but he soon saw reason for ceasing to call it high-water; for he found that, instead of one, he had two low-waters, corresponding to the two high-waters, and succeeding each other as regularly and at similar intervals as the two high-waters, and under precisely similar laws. Another curious phenomenon which would result from this view was, that, if the tide-water obey at all the law of the wave of translation, the crest of the wave would move in a straight line. Excepting there be a very great difference of depth, continued over a very wide range, it would follow its rectilineal path; and, what was extraordinary, the wave of translation had so perfectly followed the straight line in its propagation, that, if he had a small projecting corner in an artificial channel, he could propagate the tide-wave close past, without its propagating itself round the corner; and this corresponded with what was observed in the open sea. It had a very slight diffusive tendency, which shewed itself in a very marked manner. If what he had stated was the correct view of these two tides, it followed that the abnormal tide comes in from behind the southern coast of the Frith of Forth to the coast opposite at Craig; while, on the other hand, at Dunbar, the northern tide comes in to impinge upon the other coast, and predominates in forming the tide at Dunbar; so that each tide at Dunbar was due to the northern tide, and much of the tide at Craig was due to the southern tide, and this precisely concurred with the form of the tide he had mentioned; because the southern tide came in two hours earlier, and where it produced at high-water a prominence on the front of the tide-wave, and swelled out; while at low-water it fell below the tide-wave, and formed an excavation at the back of the tidal current. Thus, at Craig, there was a great protuberance in front of the curve, and an excavation at the back of the curve. But what determined the thing still more decidedly was this, that the inequality at Craig, arising from the southern tide, is the same tide of inequality that belongs to the abnormal wave up to Stirling; that we have the inequality of one kind at Craig, and of the reverse kind at Dunbar; shewing that the one is essentially the northern tide, and the other the southern. It was therefore the southern tide which, striking upon Craig, gave the inequality belonging to the duty of the southern wave; and the form of that current up the Frith of Forth was reflected across to Leith, and passed up along with the northern tide, which, striking upon Dunbar, also passed along and reached Leith; and the two then passed on together, and became confounded, as we should expect, in a remarkable manner at Leith (where the inequality was scarcely sensible); and it was about there that there was a peculiar diminution of the diurnal inequality, which was materially affected by the existence of these two tides, because the disappearance of this diurnal inequality would no longer depend upon any circumstance except its two inequalities, which meet together at the port of Leith. These were the principal circumstances which gave value to these observations, and which induced him to think it desirable to continue them, to extend them over a more considerable period of time, so as to get rid of accidental inequalities; and, in this manner, to get a thorough discussion of both these tides. But the phenomena he had now mentioned were so obvious, that they scarcely required a thorough discussion to bring them out. He had been much puzzled, both in these observations and in the former, with the phenomena of triple tides. Of course, they would put this theory out altogether; but he now found, in making much more accurate observations than formerly, that in every case of what appeared to be a triple tide, it merely happened that a flood of fresh water came down the river at that particular time; and these triple tides were only observable at Stirling, where the flood was very great. This might tend to the solution of some of the difficulties which remained in the investigations of Prof. Whewell, which he had pointed out from time to time, as requiring further investigation. It was in consequence of those observations of Mr. Whewell, that he (Mr. Russell) had been induced to make this second investigation; and he thought the results brought out strongly confirmed that gentleman's expectations and his own, in referring the existence of those two tides to the co-existence of the two tide-waves in the German Ocean, now recognised, in their separation into these channels, he believed, for the first time. Mr. Whewell, in one of his papers read before the Royal Society, had shewn an anomaly which did not appear to admit of a very ready explanation. This was, that, for instance, while there were high-tides on the east coast of Scotland, there was no tide at all on the opposite coast of Norway. He (Mr. Russell) had found, that, where two portions of any channel were shallower than the others, the two portions of the wave would form loops there, and separate at that point, and their direction became altered; but the lateral portion of the wave would go on with a very much slower motion than the forward translation of the wave, and the consequence was, that, while the wave was performing its gyrations round the one shallow point and the other, the lateral velocity was so much less than that of its direct progression, that it altogether disappeared, and we then had the phenomenon of no tide at all. This was so clearly seen in many instances, that he made the statement with considerable confidence. It happened, that that part of Norway was opposite a very projecting point on the coast of Scotland, and thus in some points of the channel there would be no tide. This was also the case in the Irish Sea, as well as in some parts of the opposite coasts in the German Ocean. These circumstances served to explain some of the anomalies hitherto so troublesome in discussions of the tides; and by a more extensive series of observations in the German Ocean, and the rivers running into it, we should be able to trace the existence of a second wave in a great variety of places.

Prof. Whewell said, these observations appeared to him very important and valuable, being, so far as he knew, the first made on the subject with the same detail and extent. He entered at some length into observations respecting the statement of Mr. Russell, in some instances expressing his gratification at the re-

sults, in others questioning the propriety of drawing conclusions without further investigation and more extended observation. He designated some of the results valuable, but vague, and pointed out the difficulty of carrying them out over the whole ocean. They will explain the anomalies and the paradox of the absence of tide, but only by obliterating the co-tidal lines. He alluded to the investigation, by the late Capt. Hewett, of the points of no tide in the German Ocean, which are now being carried on by Capt. Washington.

Mr. Russell replied, that Professor Whewell need not be afraid of his co-tidal lines; that he (Mr. Russell) had discussed these observations with an attempt to establish other co-tidal lines; but that he had abandoned them, convinced that they were the nearest the truth.

Nos. 4, 5, 6, and 7.—The first three were continuations of papers read at Plymouth last year. The latter explained the principle of a compensation-balance newly invented by Mr. Dent, in which the compensation-weights make a quicker approach towards the centre of motion upon a given increase of temperature, and the reverse upon a given decrease; and further shewed that the ordinary compensation-balance, which is composed of two segments of a circle, carries the compensation-weights over nearly equal spaces for equal increments or decrements of heat; and that, under such circumstances, the mathematical conditions are not complied with, which require that the space moved over by the compensation-weights should vary as the square of the distance from the centre of motion. This law, though it cannot be strictly appealed to where curves and springs become a part of the mechanism, is yet of application sufficiently extensive to be adduced in reasoning on the momentum. The rate of a chronometer having the compensation-pieces composed of two segments of a circle will be slower at the extremes of heat and cold than at the mean temperature; which inequality is produced by the compensation-weight moving out too far in cold, and not approaching the centre of motion sufficiently on an increase of temperature. Mr. Dent's improvement of the compenstion-balance chiefly consists in the two compensation-pieces being formed into curves, which have a uniform and, at the same time, a double action, without occasioning friction in either piece—one action producing a change in the distance of the compensation-weight from the centre of motion, the other simultaneously taking the compensation-weight either backwards or forwards, to be so acted upon by the leverage of the first action, that the compensation-weight is taken over any space required for the perfect correction of irregularity arising from temperature; or, in other words, the compensation-weight is moved further down the lever by an increase of cold, and higher up by an increase of heat. In the ordinary compensation-pieces, the distance between the centre of gravity of the weight and the junction of the compensation-pieces is lengthened by decrease, and shortened by increase, of temperature, so that the compensation-weights are removed too far out from the centre of motion by cold, and not brought sufficiently inwards by heat.

Mr. Frodsham stated that a large proportion of the error in the balances applied to chronometers might be materially reduced by a different proportion of the laminæ of the balance and of its diameter: of many chronometers constructed with reference to the above-mentioned remarks, he has seen many instances of excellent performance. He has received from the government of the United States the rates of chronometers tried at the observatory at Washington, some for twelve months, whose rates, at temperatures varying from -5^0 to $+99^0$ of Fahrenheit, were very little affected by this great change of temperature. As a certain and effectual method of correcting the compensation-balance in chronometers, whereby they may be made to keep the same time both in the extremes and middle temperatures, Mr. Frodsham exhibited a diagram of the ordinary balance, with the mean-time screws placed on one side of the bar of the balance. In the centre of this bar, on the exterior rim, was screwed a short piece of steel, extending along the outer rim three or four degrees, but perfectly free. In this piece were several small holes to receive a screw, when the balance was corrected by the ordinary compensation-pieces; that if the chronometer kept the same time at 55^0 or at 90^0, it would lose considerably at 32^0; the screw in the steel piece was therefore to be placed in such a hole, being just in contact with the outside of the rim of the balance: when at 55^0, that would reduce the length of the acting part of the compensation, and, in the colder temperatures, would allow it to recede only that distance from the centre of the balance which would make the chronometer keep the same time as in the higher and middle temperatures.

One great advantage of this invention was stated to be, that it may be applied to the balance of any chronometer which is now completed on the usual construction.

Sir T. Brisbane spoke to the liberality of Mr. Dent in carrying out the investigation whether the arc of longitude could be determined by the chronometer. Besides forwarding chronometers to New York, France, &c., he had sent twelve chronometers to Scotland. Some of them Sir T. Brisbane had taken charge of, and had established the extraordinary fact, that in the coming down and in the return there was a difference in their time of only 500ths of a second. Five of the chronometers are still with Sir T. Brisbane; and they cannot be in better hands.

SECTION B.—*Chemistry and Mineralogy.*

1. Dr. Lyon Playfair, "Abstract of Prof. Liebig's Report on Organic Chemistry applied to Physiology and Pathology."
2. Prof. Schönbein, "On the Electrolysing Power of a simple Voltaic Circle."
3. Mr. William Blyth, "On the Manufacture of Sulphuric Acid."

The first paper, by Dr. Playfair, to which we briefly alluded in last *Gazette*, is so excellent a review of Liebig's volume, and contains so much matter of the highest importance as relates to Organic Chemistry, that we are induced to return to it for the sake of a connected abstract.*

Before advancing to this, Professor Liebig's second Report, Dr. Playfair mentioned that the third, which he anticipated would be ready next year, would apply the principles of organic chemistry to diet and dietetics, under which head would be discussed the nutritiveness of particular vegetables in the fattening of cattle—a subject now more than ever of national consideration (see the new tariff, and read of agricultural alarms). The Dr. then applied to the work in hand. The first part consisted of the examination of the processes employed in the nutrition and reproduction of the various parts of the animal economy. In vegetables, as well as in animals, we recognised the existence of a force in a state of rest. It is the primary cause of growth or increase in mass of the body in which it resides. By the action of external influences, such as by pressure of air and moisture, its condition of static equilibrium was disturbed; and, entering into a state of motion or activity, it occupied itself in the production of forms. This force had received the appellation of *vital force*, or *vitality*. Vitality, though residing equally in the animal and vegetable kingdoms, produced its effects by widely different instruments. Plants subsisted entirely upon manures belonging to inorganic nature. Atmospheric air, the source whence they derived their nutriment, was considered to be a mineral by the most distinguished mineralogists. All substances, before they could form food for plants, must be resolved into organic matter; but animals, on the other hand, required highly organised atoms for nutriment. They could only subsist upon parts of an organism. They possessed within them a vegetable life, as plants did, by means of which they increased in size, without conciousness on their part; but they were distinguished from vegetables by their faculties of locomotion and sensation—faculties acting through a nervous apparatus. The true vegetative life of animals was in no way dependent upon this apparatus, for it proceeded when the means of voluntary motion and sensation were destroyed; and the most energetic volition was incapable of exerting any influence on the contractions of the heart, on the motion of the intestines, or on the processes of secretion. All parts of the animal body were produced from the fluid circulating within its organism, by virtue of vitality, which resided in every organ. A destruction of the animal body was constantly proceeding. Every motion, every manifestation of force, was the result of the transformation of the structure, or of its substance. Every conception, every mental affection, was followed by changes in the chemical nature of the secreted fluids. Every thought, every sensation, was accompanied by a change in the composition of the substance of the brain. It was to supply the waste thus produced, that food became necessary. Food was either applied in the increase of the mass of a structure (*i. e.* in nutrition), or was applied in the replacement of a structure wasted (*i. e.* in reproduction). The primary condition for the existence of life was the reception and assimilation of food. But there was another condition equally important—the continual absorption of oxygen from the atmosphere. All vital activity resulted from the mutual action of the oxygen of the atmosphere and the elements of the food. All changes in matter proceeding in the body were essentially chemical, although they were not unfrequently increased or diminished in intensity by the vital force. The influence of poisons and remedial agents on the animal economy proved, that the chemical combinations and decompositions proceeding therein, and which manifested themselves in the phenomena of vitality, might be influenced by bodies having a well-defined chemical action. Vitality was the ruling agent by which the chemical powers were made to subserve its purposes; but the acting forces were chemical. It was from this view, and no other, that we ought to view vitality.

According to Lavoisier, an adult man takes into his system, every year, 837 lb of oxygen, and yet he does not increase in weight. What,

* In doing so, we are in fairness bound to confess our obligation to the *Manchester Guardian*, which, not only in this, but in almost every other instance, has given a more full and correct report of the proceedings than we have hitherto been accustomed to find (with few exceptions) among our brethren of the provincial press.—*Ed. Lit. Gaz.*

then, becomes of the enormous quantity of oxygen introduced in the course of the year into the human system? The carbon and hydrogen of certain parts of the body have entered into combination with the oxygen introduced through the lungs and through the skin, and have been given out in the form of carbonic acid and the vapour of water. At every moment, with every expiration, parts of the body are thus removed, and are emitted into the atmosphere. No part of the oxygen inspired is again expired as such. Now, it is found that an adult inspires 32½ oz. of oxygen daily; this will convert the carbon of 24 lb of blood into carbonic acid. He must therefore take as much nutriment as will supply this daily loss; and, in fact, it is found that he does so; for the average amount of carbon in the daily food of an adult man, taking moderate exercise, is 14 oz. which require 37 oz. of oxygen for their conversion into carbonic acid. But it is obvious, as the inspired oxygen can be removed only by its conversion into carbonic acid and water, that the amount of food necessary for the support of the animal body must be in direct ratio to the quantity of oxygen taken into the system. Thus a child, in whom the organs of respiration are naturally in a state of great activity, requires food more frequently and in greater proportions to its bulk than an adult, and is also less patient of hunger. A bird, deprived of food, dies on the third day; whilst a serpent, which inspires a mere trace of oxygen, can live without food for three months. The capacity of the chest in an animal is a constant quantity; we therefore inspire the same volume of air whether at the pole or the equator; but the weight of the air, and consequently of the oxygen, varies with the temperature. Thus an adult man takes into the system daily 46,000 cubic inches of oxygen, which, if the temperature be 77°, weigh 32½ oz.; but, when the temperature sinks down to the freezing-point (32°), it will weigh 35 oz. Thus an adult in our climate in winter may inhale 35 oz. of oxygen; in Sicily he would inspire only 28½ oz.; and if in Sweden, 36 oz. Hence we inspire more carbon in cold weather, when the barometer is high, than we do in warm weather; and we must consume more or less carbon in our food in the same proportion. In our own climate the difference between summer and winter in the carbon expired, and therefore necessary for food, is as much as an eighth. Even when we consume equal weights of food, an infinitely wise Creator has so adjusted it as to meet the exigencies of climate. Thus the fruit on which the inhabitants of the south delight to feed contains only 12 per cent of carbon, whilst the bacon and train-oil enjoyed by the inhabitants of the Arctic regions contain from 66 to 80 per cent of the same element. Now the mutual action between the elements of food and the oxygen of the air is the source of animal heat. All living creatures, whose existence depends on the absorption of oxygen, possess within themselves a source of heat independent of the medium in which they exist; this heat, in Professor Liebig's opinion, is wholly due to the combustion of the carbon and hydrogen contained in the food which they consume. Animal heat exists only in those parts of the body through which arterial blood (and with it oxygen in solution) circulates. The carbon and hydrogen of food, in being converted by oxygen into carbonic acid and water, must give out as much heat as if they were burned in the open air; the only difference is, that this heat is spread over unequal spaces of time, but the actual amount is always the same. The temperature of the human body is the same in the torrid as in the frigid zone; but, as the body may be considered in the light of a heated vessel, which cools with an accelerated rapidity, the colder the surrounding medium, it is obvious that the fuel necessary to retain its heat must vary in different climates. Thus less heat is necessary in Palermo, where the temperature of the air is that of the human body, than in the polar regions, where it is about 90 degrees lower. In the animal body the food is the fuel, and by a proper supply of oxygen we obtain the food given out during its combustion in winter. When we take exercise in a cold atmosphere, we respire a greater amount of oxygen, which implies a more abundant supply of carbon in the food; and by taking this food we form the most efficient protection against the cold. A starving man is soon frozen to death; and every one knows that the animals of prey of the Arctic regions are far more voracious than those of the torrid zone. Our clothing is merely an equivalent for food, and the more warmly we are clothed, the less food we require. Were we to go destitute of clothes, like certain savage tribes,—or if, in hunting or fishing, we were exposed to the same degree of cold as the Samoyedes,—we could with ease consume 10 lb of flesh, and perhaps a dozen tallow candles to the bargain, as warmly-clad travellers have related with astonishment of those people.* Then could we take the same quantity of brandy or blubber of fish without bad effects, and learn to appreciate the delicacy of train-oil. We thus perceive an explanation of the apparently anomalous habits of different nations. The maccaroni of the Italian, and the train-oil of the Greenlander and the Russian, are not adventitious freaks of taste, but necessary articles fitted to administer to their comfort in the climates in which they have been born; the colder the region, the more combustible must the food be. The Englishman in Jamaica perceives with regret the disappearance of his appetite, which in England had been a constant recurring source of enjoyment; by the use of aromatics he creates an artificial appetite, and eats as much food as he did at home; but he thus unfits himself for the climate in which he is placed,—for sufficient oxygen does not enter his system to combine with the carbon consumed, and the heat of the climate prevents him taking exercise to increase the number of his respirations. The carbon of the food is therefore forced into other channels, and disease results. England, on the other hand, sends her dyspeptic patients to southern climates. In our own land their impaired digestive organs are unable to fit the food for that state in which it best unites with the oxygen of the air, which therefore acts on the organs of respiration themselves, thus producing pulmonary complaints; but when they are removed to warmer climates, they absorb less oxygen and take less food, and the diseased organs of digestion have sufficient power to place the diminished amount of food in equilibrium with the respired oxygen; just as we would expect from these views, in our own climate, hepatic diseases, or diseases arising from excess of carbon, are more prevalent in summer, and in winter pulmonic diseases, or those arising from an excess of oxygen. The professor then went on to disprove the notion that animal heat is due to nervous influence and not to combustion—an error which had its origin in supposing that the combustion proceeds in the blood itself. He also shewed that animal heat must not be ascribed to the contraction of the muscles, but that the heat evolved by the combustion of carbon in the body is sufficient to account for the phenomena of animal heat. He shewed that the 14 ounces of carbon which are daily converted into carbonic acid in an adult disengage no less than 197·477° of heat; a quantity which would convert 24lb of water, at the temperature of the body, into vapour; and if we assume that the quantity of water vapourised through the skin and lungs amounts to 3lb, then we have still 146·380° of heat to sustain the temperature of the body. And when we take into calculation the heat evolved by the hydrogen of the food, and the small specific heat possessed by the organs generally, no doubt could be entertained that the heat evolved in the process of combustion, to which the food is subjected in the body, is amply sufficient to explain the constant temperature of the body. From what has preceded, it is obvious that the amount of carbon consumed in food ought to depend on the climate, density of air, and occupation of the individual. A man will require less carbon when pursuing a sedentary occupation than when he is engaged in active exercise.—Professor Liebig, having thus discussed the source of animal heat, proceeds next to consider what are the ingredients in the food which may properly be considered to be nutritious. Physiologists conceive that the various organs in the body have originally been formed from blood. If this be admitted, it is obvious that those substances only can be considered as nutritious which are susceptible of being transformed into blood. The professor then entered upon an examination of the composition of blood, and of the identity in chemical composition of fibrine and albumen. The nutritive process is simplest in the case of the carnivora. This class of animals live on the blood and flesh of the graminivora, whose blood and flesh is identical with their own. In a chemical sense, therefore, a carnivorous animal, in taking food, feeds upon itself; for the nutriment is identical in composition with its own tissues. He next inquired, from what constituents of vegetables the blood of the graminivorous animals is produced. The nitrogenised compounds of vegetables forming the food of graminivorous animals are called vegetable fibrine, vegetable albumen, and vegetable caseine. Now, analysis has led to the interesting result, that they are exactly of the same composition in 100 parts; and, what is still more extraordinary, they are absolutely identical with the chief constituents of the blood—animal fibrine and animal albumen. By identity, be it remarked, we do not imply similarity, but absolute identity, even as far as their inorganic constituents are concerned. These considerations shewed the beautiful simplicity of nutrition. In point of fact, vegetables produce, in their inorganism, the blood of all animals. Animal and vegetable life are therefore most closely connected. The professor has still to account for the use of the substances in food which are absolutely destitute of nitrogen, but which we know are absolutely necessary to animal life. In all these we find a great excess of carbon, and but very little oxygen. By a train of admirable reasoning, he arrives at the interesting conclusion, that they are solely exhausted in the production of animal heat, being converted by the oxygen of the air into carbonic acid and water. This portion of the report contained an ingenious and important view of the use of bile in the animal economy, the truth of which quantitative physiology dare not deny. When exercise is denied to graminivorous and omnivorous animals, this is tantamount to a defi-

* A sportsman or traveller in the Highlands of Scotland knows how much more he can *whisky it*, &c. than in the south.—*Ed. Lit. Gaz.*

cient supply of oxygen. The carbon of the food not meeting with sufficient oxygen to consume it, passes into the compounds containing a large excess of carbon, and deficiency of oxygen; or, in other words, fat is produced. Liebeg is led to the startling conclusion, that fat is altogether an abnormal and unnatural production, arising from the adaptation of nature to circumstances, and not of circumstances to nature—altogether arising from a disproportion of carbon in the food to that of the oxygen respired by the lungs, or absorbed by the skin. Wild animals in a state of nature do not contain fat. The Bedouin or Arab of the desert, who shews with pride his lean, muscular, sinewy limbs, is altogether free from fat. And the professor points out the diseases arising from this cause, and furnishes some valuable hints to therapeutics. From all that has transpired, we may sum up the nutritious elements of food as follow. The ingredients adapted for the formation of the blood, and which the professor calls the plastic elements of nutrition, are as follow:—Vegetable fibrine, vegetable albumen, vegetable caseine, animal flesh, animal blood. The other ingredients of food, being fitted to retain the temperature of the body, he calls the elements of respiration. They are—fat, starch, gum, cane-sugar, grape-sugar, sugar of milk, pectine, bassorine, beer, wine, spirits. These are Professor Liebig's general principles of nutrition. The second part of the work consists of details, in which he examines the chemical processes engaged in the production of bile, of urea, uric acid and its compounds, as well as of cerebral and nervous substance. The conclusions to which he has arrived on these subjects are of such great and startling interest, that Dr. Playfair said, he dare not venture to make an abstract of them, without entering into the calculations with which they were accompanied. In the professor's explanatory remarks on digestion, he ascribes a singular function to saliva. This fluid possesses the remarkable property of enclosing air in the shape of froth, in a far higher degree even than soap-suds. This air, by means of the saliva, accompanies the food into the stomach, and there its oxygen enters into combination with the constituents of the food, whilst its nitrogen is again given out through the lungs or skin. The longer digestion continues, the greater is the quantity of saliva, and consequently of air, which enters the stomach. Rumination, in certain graminivorous animals, has plainly for one object a renewed and repeated introduction of oxygen. The professor further touches upon the use of tea and coffee as an article of food. Recent chemical research has proved that the active principles of tea and coffee—viz. teine and caffeine—are absolutely one and the same body, perfectly identical in every respect. The action of tea and coffee on the system must be therefore the same. How is it that the practice of taking them has become necessary to whole nations? Caffeine (theine) is a highly nitrogenised body. Bile, as is well known, contains an essential nitrogenised ingredient—taurine. Now, Professor Liebig considers that caffeine goes to the production of this taurine; and, if an infusion of tea contains only one-tenth of a grain of caffeine, still, if it contribute, in point of fact, to the formation of bile, the action even of such a quantity cannot be looked upon as a nullity. Neither can it be denied, that, in case of using an excess of non-azotised food, or deficiency of motion, which is required to cause the change of matter in the tissues, and thus to yield nitrogenised matter of the bile, that in such a condition the state of health may be benefited by the use of tea or coffee, by which may be furnished the nitrogenised product produced in the healthy state of the body, and essential to the production of an important element of respiration. The American Indian, with his present habits of living solely on flesh, could not with any comfort use tea as an article of food; for his tissues waste with such rapidity, that, on the contrary, he has to take something to retard this waste. And it is worthy of remark, that he has discovered in tobacco-smoke a means of retarding the change of matter in the tissues of his body, and thereby of making hunger more endurable. Nor can he withstand the captivation of brandy, which, acting as an element of respiration, puts a stop to the change of matter, by performing the function which properly belongs to the products of the metamorphosed tissues. The third part of Liebig's report treats of the recondite laws of the phenomena of motion; but as it is principally of a speculative character, we pass it over. The professor concludes his valuable communication by two chapters: one on the theory of disease; the other on the theory of respiration. The whole life of animals consists of a conflict between chemical forces and the vital powers. In the normal state of the body of an adult both stand in equilibrium. Every mechanical or chemical agency which disturbs the restoration of this equilibrium is a cause of disease. Disease occurs when the resistance offered by the vital force is weaker than the acting cause of disturbance. Death is that condition in which chemical or mechanical powers gain the ascendancy, and all resistance on the part of the vital force ceases. Every abnormal condition of supply or waste may be called disease. It is evident that one and the same cause of disease—that is, of disturbance—will have different effects, according to the period of life. A cause of disease, added to the cause of waste, may in old age annihilate the resistance of the vital powers, or, in other words, occasion death; while, in the adult state, it may produce only a disproportion between supply and waste; and in infancy only an abstract state of health, *i. e.* an equilibrium between supply and waste. Professor Liebig argues, from what has preceded, that a deficiency of resistance in a living part to the cause of waste is, in fact, a deficiency of resistance to the action of the oxygen of the atmosphere. The professor's theory may be compared to a self-regulating steam-engine. The body, in regard to the production of heat and of force, acts just like one of those machines. With the lowering of the external temperature, the respiration becomes deeper and more frequent; oxygen is supplied in greater quantity, and of greater density; the change of matter is increased, and more food must be supplied, if the temperature of the body is to remain unchanged. It has been proved, that iron is not necessary to the colouring matter of the blood, but that it forms an essential constituent of blood-globules. These globules, it is well known, take no part in nutrition. Professor Liebig conceives that the iron is the great means of conveying to the lungs the carbonic acid formed in the system; and he has made a calculation, that the iron contained in the body could actually convey twice as much carbonic acid as is expelled daily from the system.

Dr. Playfair, to whom the public is indebted for this able summary, on receiving the thanks of the Section (also voted to Prof. Liebig), stated that he had prepared it for a popular assemblage, and referred the more scientific portion of his hearers to the original, for farther information.

Of the 2d paper, by Prof. Schönbein, read by Mr. Solly, we reported all that seems called for in our last.

The 3d, by Mr. W. Blyth, on the manufacture of sulphuric acid; and in this we have only to qualify the language of our preceding notice. The words "foreign and dangerous" ought to be understood as applying to the dyer, whose great object it is to obtain the acid free from nitrogeneous compounds; and it was stated as the result of Mr. Blyth's experiments, that, in order to obtain sulphuric acid sufficiently pure to be used in the preparation of sulphate of indigo, it would only be necessary to draw the acid from the chamber at a low specific gravity, not higher perhaps than 1·300 or 1·350.

M. Adolph Rose, of Berlin, whose publication on the subject was much referred to, also states, that if rectified sulphuric acid, which is contaminated either with nitric acid or nitric oxide, be diluted with twice its bulk of water, and concentrated by distillation till it reaches the specific gravity 1·84, the concentrated acid will be found to have been freed from both of these compounds.

SECTION C.—*Geology.*

1. Profs. H. D. Rogers and W. B. Rogers, "On the Physical Structure of the Appalachian Chain."
2. "Report of Committee for Registering Shocks of Earthquakes in Great Britain."
3. Dr. James Stark, "On the Structure and mode of Formation of Glaciers."

To our short notice of this Section we have nothing to add; and it is only to relieve the monotony of dry discussion, that we insert the humorous geological colloquy which ensued after the reading of the Earthquake-report. Readers cannot fail to observe how often in the midst of such ebullitions of *Philosophy in Sport*, the most interesting mosaics of information are inserted, and consequent instruction conveyed.

The President, Mr. Murchison, observed, the report was most useful and valuable; and though it did not establish, to the satisfaction of geologists, as much oscillation as they could wish for—(*laughter*),—and although the committee called for much finer instruments to indicate the slighter vibrations, horizontal and vertical, yet the attempt hitherto made had been very successful; and it was the duty of the Association to grant the further requests which those inquiries called for.—Dr. Buckland said, he had been, for the last few years, in the habit of reading of earthquakes, and had formed a very large volume of the accounts of them, which he had cut out of the newspapers; but it was not till lately that he felt his proximity to the sphere of their action. It was a matter of fact, that within the two preceding years, either 170, or 270, earthquakes had occurred along the line of country in Perthshire, parallel to the Grampians. As soon as the Association in London entered into the inquiry in London, it occurred to them that Chichester and Swansea were subject to them, and also the line of elevation in South Wales and Falmouth. He had written to Mr. Were Fox, at Falmouth, to undertake the direction of certain size-mometers to measure the intensity of earthquakes; and the moment the letter arrived in Falmouth, he felt an earthquake which extended 20 miles round Falmouth. He did not mean to say, that the arrival of his letter caused the earthquake, but it was a remarkable coincidence; and it would not surprise him to hear of an earthquake within ten miles of Manchester, before the Association left it; it therefore behoved

every person to make their will, and keep a size-mometer in their bed-room.—(*Laughter*). He went to see a lady who promised him a good dinner and an earthquake; but he happened to go before the earthquake-season began,—for in Scotland there is a season for earthquakes as well as for grouse-shooting. Among the juvenile amusements which he experienced, that of being tossed in a blanket was one. But there was a preceding operation; the blanket was held by the four corners, and then an undulatory movement commenced, followed by a straining and high tension of the four angles, and the undulations passing across the blanket were felt from one end to the other. Now, if the blanket were taken to represent the strata of the earth, and the unhappy culprit to be the town of Combrie, or the noddy of the steeple, some notion of the appearances of an earthquake might be induced. Whatever happened to the blanket affected the boy; if the blanket was thrown up high, a mountain might come on; and if there were a filling up beneath, the mountain would not descend again. Strata were operated on similarly; and it was important that instruments should be procured to measure the operations which were constantly going on. It was important to measure the actual movements of shocks from east to west, and from north to south, so as to be able to give a reason why the cracks produced in walls by earthquakes ran from north to south, and not from east to west; and to shew why some chimneys are thrown down, and others in the same house not moved. It was also important that instruments should be made for ascertaining the state of the weather at the time of those shocks, in order that it might be seen whether the weather was affected by the earthquake, or the earthquake by the weather. He thought the atmosphere could produce very slight effects on the solid materials beneath the earth's surface. But it was a fact well known in physics, that water discharged from springs affected the state of the atmosphere, and that the atmosphere sometimes depressed waters of the tides 14 inches. These facts, connected with physics and meteorology, justified the application of instruments to measure the condition of the atmosphere during the operation of earthquakes.—Prof. Sedgwick thought it was exceedingly important that instruments for making such observations should be employed, not only in this country, but also in Chili and elsewhere. Whether it could be shewn to be connected with the state of the atmosphere or not, it was a curious thing that earthquakes had a season; and it was one of those points to which the attention of the Association should be directed.—Dr. Buckland said, the earthquake-season in Scotland was the rainy season; and it was supposed by some, that the quantity of water which descended downwards then affected the depositions. It appeared, however, from instruments invented by Dr. Dalton, that water falling in the shape of rain did not penetrate more than three feet into the ground. This water was absorbed, during the summer-time, by vegetation and heat; but in autumn, when the rain descended through crevices, or by means of capillary attraction, it might affect the rocks, and produce chemical changes.

After some remarks from Sir H. de la Beche, Mr. Nicholson, of Kendal, stated, that an earthquake had occurred at Morecombe Bay, on Monday morning last, about two o'clock. On Sunday the thermometer was at the highest point at which it had been since 1826. At half-past one o'clock it was 84° in the shade. The shock, which took place the following morning, was felt about ten miles round Kendal: it occurred after a great drought, which shewed that it had nothing to do with the rainy season.

SECTION D.—*Zoology and Botany.*

1. Dr. John Richardson, "Report on the Ichthyology of New Zealand."
2. Capt. Beechy, R.N., "Results of Dredging at depths varying from 50 to 145 fathoms, off the Mull of Galloway."
3. Mr. Hyndman, "Results of Dredging off the Mull of Cantyre; and off Ballygally Head, county Antrim," by Mr. Patterson.
4. Mr. Babington, "Report on the Preservation of Animal and Vegetable Substances."
5. Mr. Moore exhibited the head of a Grayling, shewing its pear-shaped iris; also specimens of *Argulus foliaceus*, and other parasites.
6. Dr. Richardson, "On the genus *Maclœrium*."
7. Mr. Blackwall, "On the structure and uses of the Palpi of Spiders."

1. In addition to what we before stated relative to Dr. Richardson's paper, we have to notice that birds are very numerous in the important and rising colony of New Zealand—the Egg-Britain of our antipodes and of future ages. Quadrupeds, on the contrary, are rare; and, as in Ireland, neither serpents nor snakes have been found. The able naturalist took a retrospect of what had been observed by Cook and Solander; and also referred to the accounts in the *Histoire des Poissons*, respecting the animal creation in the Australian regions. Next year, however, this report will be completed; and at present we have only to acknowledge the accession to our information supplied by Dr. Richardson.

2 and 3. Were a series of dredging-reports, all furnishing data of considerable interest; which will probably be wrought into connected form when Mr. E. Forbes returns from his Ægean expedition, and which we hope to see at the next meeting.

4. The Report by Mr. Babington (one of the useful class, which interests every body, for every body is interested in the preservation of provisions,) only proposed to state the results and terminate the series of experiments commenced by the former committee appointed at the Liverpool meeting in 1837; and the whole supplies very considerable negative evidence upon the preserving powers of different materials taken separately. It then reviewed the experiments previously in progress; and next took up those which were new and in which vegetable substances occupy a more prominent place.

The experiments were commenced in June 1838, and have thus continued four years. They were made by placing in small glass jars (5 inches by 2) solutions in water of the different substances unmixed, but tried in three proportions: viz. 1. a saturated solution; 2. a solution diluted with an equal quantity of water; and 3. with a double quantity. The following are lists of them, arranged according to their value as preservatives of animal substances.

1. Good preservatives: naphtha employed in the proportion of 1 part to 7 of water.

2. Moderately good, but the specimens soft: sulphate of magnesia, arseniate of potash.

3. Moderately good when examined in 1840, but the specimens now decomposed: alum, muriate of ammonia, muriate of magnesia, nitre, sulphate of zinc, bicarbonate of potash, arsenious acid.

4. Quite useless for the purpose of preservation: sulphate of iron, sulphate of copper, sulphate of soda, sulphate of potash, carbonate of ammonia, nitrate of barytes, nitrate of strontian, nitrate of soda, muriate of barytes, muriate of lime, phosphate of soda, chloride of potash, oxalic acid, and rough pyroligneous acid.

A few drops of kreosote in water is a good preservative, but stains the specimens brown. Corrosive sublimate preserves perfectly, but hardens the substances too much. Concentrated acetic acid decomposes the skin, bones, and cellular membrane, but leaves the muscles untouched, *i. e.* preserved.

The vegetable specimens are well preserved in oxalic acid, concentrated acetic acid, naphtha, and kreosote—moderately well in muriate of ammonia, nitrate of ammonia, and corrosive sublimate. None of the others appear to have succeeded; nor, indeed, is the colour of the vegetables well preserved in any case; and, on the whole, the experiments with them are far from satisfactory.

The only other paper which requires notice was the last, which demonstrates an extraordinary office in the palpi of spiders, but only fit for scientific Reports.

SECTION E.—*Medical Science.*

Besides Prof. Williams on auscultation, recommending in many cases the application of the stethoscope below the shoulder-blade, Sir David Dickson read the report on cases of ascites and aneurism.

SECTION F.—*Statistics.*

The first communication was contributed by Mrs. Davies, widow of the late Gilbert Davies, Esq. M.P., pres. of the Royal Society, "On the advantages arising from spade-husbandry."

The paper, which was read by Mr. G. W. Hall, contained, among other particulars, an interesting account of an industrial school which had lately been established by Mrs. Davies. As the distressed labourers said it was employment they wanted, and not charity, she wished to shew that the influential classes had means within their reach, which, if called into exercise, would speedily give ample employment and a sufficiency of food to all. It was only lately that she had become aware of the great advantages that would result from a more careful cultivation of the soil; but from what had taken place under her own observation within the last few years, she felt persuaded, that, by due management, the most fruitful causes of poverty and distress in this country might soon be removed. It had been stated in the House of Commons by Mr. Pusey, that the average produce of land in Great Britain was twenty-six bushels of wheat an acre. Now, if it were possible, merely by an improved mode of cultivation, without any additional expense, to increase the produce to twenty-seven bushels an acre, this would give an increase of 475,000 quarters, which, at the average price of grain, would be worth 1,200,000*l.* per annum, equal to a capital of 36,000,000*l.* gained for ever. But, in her own experience, she had found far greater results than this. By careful weeding, manuring, and cultivation of the land, which was in many instances done at very little expense, she found that some of her tenants raised forty bushels of wheat an acre; that they were paying double the rent which she received for the same land when it was in large farms; and that, out of 124 tenants among whom the land was now divided, not one had fallen a single farthing in arrears since 1830. With regard to the industrial school which had been lately formed under her patronage, the results had been very gratifying. It appeared that the schoolmaster paid 11*l.* per annum for his dwelling-house and school, in addition to which he held three acres of land, at 3*l.* per acre. His school consisted of twenty boys, of the average age of eight years, who worked for him, at out-door labour, three hours a day, in return for three hours' instruction in reading, writing, and ac-

counts. The boys thus educated were much better able when they left school to undertake farm-labour from the practice they had had; and the schoolmaster considered that their labour amply rewarded him for the instruction he gave them. From the manner in which his land was cultivated, he had been enabled to keep two cows, where he would otherwise not have been enabled to keep more than one: indeed, as was stated by the writer of the paper, but for the school, and the labour he derived from the scholars, he would have been forced to go into the workhouse with his family, consisting of five persons, which would have cost the township about 39*l.* a year. The writer concluded, by remarking that the statements she had made regarding an increase of rent from the small allotment-system, would, no doubt, surprise those who imagined that large farms must necessarily be the most productive; but experience was better than theory.

Considerable discussion ensued, in which Col. Sykes, Mr. Woollcombe of Plymouth, Mr. H. J. Porter, Mr. Hall, and the chairman Mr. Wood, M.P., participated; and much praise was bestowed on the paper and its benevolent author.

Col. Sykes could not help considering the paper as one of the most remarkable he had ever heard read. The truth was, that some of the results which had been obtained seemed almost miraculous. Think, for instance, of this schoolmaster, who might otherwise have been an inmate of the workhouse, not only teaching twenty boys the rudiments of an ordinary education — reading, writing, and accounts—without receiving any wages, but also of his actually paying 3*l.* per acre for his land! Hardly less wonderful was the fact, that out of 124 tenants, all paying a high rent for their land, not one had fallen a single farthing behind with his rent during the last eleven years. If there was a surplus population in the agricultural districts, as there seemed to be, it was surely time that something was done to provide employment; and the plan referred to in the paper which had been read, was one which only required to be better known in order to be more extensively acted upon.

Mr. Porter begged to know what was the expense of the school established by Mrs. Davies.

Mr. Hall said the only expense was the cost of erecting the school.

Mr. Porter said the effects produced by such simple means did certainly appear magical; but he could give them a little information which would help to explain how it was done. He had found that by proper management one man could get two crops out of the ground, where another man could get only one. He knew that this had often been done with green crops; but he had actually tried it with potatoes. After digging a quantity of early potatoes on the 1st of July last year, he had at once planted the same land with another crop.

Mr. Hall: With old seed?

Mr. Porter: Yes, with old seed, and plenty of manure; and in due time I had as fine a crop as the first one.

Col. Sykes said, he understood that the East India Company had introduced a new sort of lucern from Cabul, which would be much more early than any of the grasses at present cultivated in this country. There was a considerable quantity of this lucern-seed at the India House; and he would have much pleasure in supplying those gentlemen with it who wished to give it a trial.

2. Mr. Noble, "On the influence of the Factory system in the development of Pulmonary Consumption,"—after animadverting on the diversity of opinions on this subject—some in favour, and some quite the reverse—proposed to inquire to what extent the positive results obtained by the registrar-general in 1839 confirmed the idea, that consumption is more frequent in Manchester than in less densely populated districts. According to the census of 1831 (that of 1841 not having been obtained at the period of compiling the registrar's last reports), there were resident in Manchester and Salford 49,392 families; and the total deaths registered in 1839 amounted to 9223, of which 1454 are recorded as having been from consumption. This was, in round numbers, in the proportion of about one death annually from consumption to every 34 families; and, in the total deaths from all causes, of three from consumption in every 19. Now, certainly, these facts furnished a very decided proof of the extensive prevalence of the disease in this district; and it might also seem to afford a decided confirmation of the doctrine, that factory-employment tends to produce consumption. If we extended our inquiries to other parts of the kingdom, this supposition was still farther confirmed. But it ought always to be kept in mind, that, independent of employment in factories, there were many influences at work in large towns which necessarily tended to shorten life. So far as the working classes were concerned, the confined atmosphere of their dwellings, many of them residing in cellars, the irregularity of employment, and the variations in the rate of wages, all tended to increase the rate of mortality. Mr. N. entered at length into comparisons with various populous towns, agricultural districts, &c.; and argued, from these numerical statements, which were of unquestionable authenticity, it was evident that Manchester and Salford were much more free from consumption than some other large towns. Thus far, then, they had looked in vain for evidence in favour of the assertion, that the factory-system is favourable to the development of pulmonary consumption. He applied the same reasoning to the persons actually employed in factories between the ages of 15 and 40. Of the 174 deaths of factory-operatives during the years 1838, 1839, and 1840, the following table would shew the nature of the occupation:—

Spinners	45
Winders	49
Piecers	28
Reelers	15
Carders	11
Frame-tenders	11
Not specified	15
	174

It might still be said, however, that factory-labour prematurely exhausted the vital energies, and gave rise to an unusually early mortality from various chronic diseases. But if such were the fact, they would surely expect to find such early mortality manifested in the cases registered as consumption. Anxious to see how far this was the case, he had classified the ages of the 1141 deaths from consumption in the township of Manchester, and the result was as follows:—

Age.	*Deaths.*
15 and under 20	195
20 „ 25	243
25 „ 30	260
30 „ 35	223
35 „ 40	220

Now, on comparing these numbers with data of a similar nature regarding other towns, he found a most remarkable coincidence. Take, for example, the table which Sir James Clarke had given in his work on tubercular phthisis, of the proportion, at different ages above 15, of 1000 deaths from pulmonary consumption, and it would be found to approach very closely to those he had given. In a table compiled from the mortality-returns of Berlin, Chester, Carlisle, Paris, Edinburgh, Nottingham, and Philadelphia, that writer had shewn that the deaths, at different ages, were in the following proportions:—

Ages.	*Deaths.*
15 and under 20	99 in every 1000.
20 „ 30	285 „ „
30 „ 40	248 „ „

It would be seen, therefore, by comparing these numbers with those in the preceding table, that they bore very nearly the same relation to each other in both cases; from which it might fairly be concluded that the population of Manchester is not at all more liable to the early invasion of this malady than that of other places. The general conclusion from all these facts was, that manufacturing habits do not exert any unusual influence in the production or premature development of pulmonary consumption, seeing that the vital statistics of this metropolis of the cotton-manufacture, so far as they have been analysed and compared with similar data from other towns, exhibit no preponderance of deaths from that cause; but, on the contrary, a smaller rate of mortality, compared with the number of deaths from other causes, than was to be found in the rural districts. In conclusion, Mr. Noble remarked, that he was far from entertaining the opinion, which some did, that factory-labour was protective from scrofulous diseases, and conducive to general good health. On the contrary, he believed that it was most prejudicial to sound health; but, at the same time, he felt satisfied that in this respect it differed very little, if at all, from most other occupations at which the great mass of the working population in towns were obliged to labour for their livelihood.

Dr. Alison observed, that all deductions from the registration-returns must be considered as merely approximations, and by no means as warranting any absolute conclusions. In the classification of diseases, it was beyond all question that many errors were to be found; and this ought always to be kept in mind when reasoning from such data. It was highly desirable on many accounts that some means should be taken to render those returns more correct. It had been suggested by various medical authorities, that in the registering of deaths two modes of classification should be followed:—1st, that a distinction should be made between acute and chronic diseases; and 2d, that the name of the disease should not be mentioned, but merely the seat of the disease, as disease of the head, the heart, or the stomach; and that in no case should the cause of disease be registered by any but medical men. Were this mode adopted, they would have a much smaller number of deaths to go upon; but there would be this advantage, that the data they would then have would be correct.

This was followed by Mr. Hopkins, of Preston, who read a statement of the number of executions for capital offences which had taken place in Lancaster, and the crimes of which the parties had been convicted, within the last sixty years. It appeared from the summary, that since 1782 the number of persons executed in this county was 260, and that of that number there were 10 females. In April, 1838, one person had been executed at Kirkdale, and this was the only execution which had taken place in Lancashire within the last six years. With regard to the crimes for which the parties had been condemned to death, it was stated

that 54 had been convicted of uttering forged notes, and 13 of having committed forgery; 33 had been found guilty of murder, 48 of burglary, 53 of robbery, 9 of horse-stealing, 2 of malicious shooting, 2 of having returned from transportation, 1 of having seduced a soldier, and the rest of various offences.

In answer to a question from Col. Sykes, Mr. H. said he had not paid attention to any alterations caused by the change in the laws affecting capital punishments.

3. The Rev. R. Parkinson read a paper on the registers of births, deaths, and marriages of the Collegiate Church of Manchester. He commenced by giving a brief outline of the various laws which had been enacted from time to time for the purpose of enforcing an accurate system of registration. The first enactment on the subject was that of Henry VIII., in 1538, by which it was ordered that in all churches a register of births, deaths, and marriages should be kept. The next period at which he found any notice of the matter was under the reign of Edward VI., after which laws had been passed at various times enforcing the keeping of a correct register in each parish church. Among other enactments connected with registration, there was one act, he said, the 6th and 7th of William and Mary, by which it was ordered that 4*s.* per head should be paid for the registering of every funeral, even the poorest person. For the funeral of a duke the sum of 50*l.* was charged in addition to the 4*s.*; for a marquis, 30*l.*; and so on down to a simple gentleman, for whom only 1*l.* was paid. The charge for an archbishop was 50*l.*; for a bishop, 30*l.*; and for a canon, 2*l.* 10*s.* For the registration of births there was a general charge of 2*s.* per head upon all persons, rich and poor, but in addition to that, for the eldest son of a duke the charge was 30*l.*; for the eldest son of a marquis, 25*l.*; and so on through all the various gradations of rank. Mr. Parkinson then referred at some length to the following table, of which copies had been distributed to the members of the Section:—

The number of marriages recorded in the Register-books of the Collegiate Church, Manchester, from their commencement in the year 1573, to the end of the year 1841, shewing the total amount every twenty years:—

From 1573 to 1580,	both inclusive	367
,, 1581 to 1600,	,,	808
,, 1601 to 1620,	,,	1,587
,, 1621 to 1640,	,,	1,644
,, 1641 to 1653,	,,	634
,, 1654 to 1661,	(this portion is missing)	—
,, 1662 to 1680,	both inclusive	1,340
,, 1681 to 1700,	,,	1,587
,, 1701 to 1720,	,,	2,701
,, 1721 to 1740,	,,	3,931
,, 1741 to 1760,	,,	5,587
,, 1761 to 1780,	,,	8,436
,, 1781 to 1800,	,,	20,888
,, 1801 to 1820,	,,	30,413
,, 1821 to 1841,	,,	53,316

We have here merely given the table relating to marriages, that being the only portion of the register from which any certain deductions could be drawn. The reverend gentleman, in the course of his remarks, called attention to the surprising increase in the number of marriages which had taken place since 1573,—an increase almost without a parallel in the history of any town in the kingdom. After the paper was read, some discussion took place on it, in which the chairman, Col. Sykes, Mr. H. Hallam, the Rev. C. D. Wray, Mr. P. H. Holland, and Mr. Ald. Shuttleworth, took part.

4. Mr. H. J. Porter read a continuation of his paper last year "On the Loan-Funds of Ireland," from which it appeared that, with the exception of Kerry, loan-fund societies have been established in every county in Ireland. The increase in the number of these societies which had taken place since last year was as follows:—Ulster, 70; Leinster, 103; Munster, 60; Connaught, 27. The amount of money lent in 1841, was in Ulster, 572,000*l.*; Leinster, 512,000*l.*; Munster, 262,000*l.*; Connaught, 90,000*l.*; total amount, 1,438,598. The number of loans granted was, to Ulster, 149,000*l.*; Leinster, 142,000*l.*; Munster, 98,000*l.*; and Connaught, 30,000*l.* The profits, after paying all expenses, were, in Ulster, 5,836*l.*; Leinster, 6,791*l.*; Munster, 2,802*l.*; Connaught, 642*l.* The number of persons who had invested their savings in these societies was, in Ulster, 1,528; Leinster, 1,824; Munster, 941; Connaught, 235.

SECTION G.—*Mechanical Science.*

1. *Mr. Vignoles' Report on Railway Sections.*—The whole of the grant for this service, 200*l.*, has been expended, and the results were now laid before the Sections originating the subject, in the shape of the numerous working plans and sections of several of the railways and of the enlarged parts of the profiles of the excavations. In obtaining these the committee appointed by the Association have great pleasure in reporting that they have been aided in the most effective and satisfactory manner by all the railway-companies to whom they have applied, and also by their several officers; the engineers in particular having taken extreme pains and great interest in forwarding the views of the Association. When so many parties have thus zealously co-operated, it might be almost invidious to name one without specifying all; but, in particularly mentioning Mr. Swanwick, the engineer of the North Midland Railway, the committee wish to do so for the purpose of remarking on the great pains taken by that gentleman in marking, as his works went on, all the geological details of the cuttings which pass through so interesting a region, and which has put into possession of the committee a vast extent of most valuable records of the kind sought for, and which, at the same time, forms a most striking example, well worthy of imitation, of the combination of engineers' and geological information applicable for economic purposes. The committee were not at first able to organise a system of working the grant to their entire satisfaction; but they found, after some experience, that with the favourable disposition shewn by all the railway-companies, they might, without increasing the expenses, by degrees and in no great time, be able to form an interesting and valuable collection, not only of the section of the excavation of the railways, but the whole of the plans and profiles of all the lines, which, concentrated in one public depository, and open to the inspection of all scientific and literary bodies and individuals, and to the public in general under proper regulations, would be of high interest. In fact, such documents were almost necessarily required, as the mere indices whereby to identify the particular geological profiles; and so useful and important is such a collection likely to become, that it is not unreasonable for the committee to hope and believe that after another year's experience shall have matured this arrangement and perfected this proposed system of record, and brought down the expense to a certain and moderate rate, plans on this subject may be taken up by her Majesty's government, and made to form part of the great geological survey of the United Kingdom conducted by Sir H. de la Beche, in connexion with the trigonometrical survey now carrying on by Col. Colby and the officers of the corps of royal engineers. The committee, therefore, are not without hope that the Geological and Mechanical Section will again unite in applying to the general committee for a further grant at the present meeting, to enable them to complete the organisation they have begun. The documents which the committee have to submit are the following:—1. Plans and sections of the Midland Counties' Railway from Rugby to Derby and Nottingham, about 68 miles; enlarged sections of the cuttings on that railway prepared to be filled in geologically. The chief character of this district is the gypsum-beds, commonly called plaster of Paris, and the hydraulic lime well known to engineers as the Barrow limes.—2. Plans and sections of the whole of the North Midland Railway from Derby to Leeds, about 72 miles. The whole of the geological detail has been laid down on the sections of the cuttings; but as it has been considered by the committee that an uniform system should be observed, enlarged sections have been prepared, on which, as on similar sections of the other lines, the strata should be delineated. It may be observed here, that these enlarged sections are on the natural scale of forty feet to an inch. It is the vertical and horizontal scale alike, which is not always the case in the ordinary geological sections, and very seldom so with the working sections for earth-work and similar engineering purposes. This railway intersects the coal-district for many miles.—3. Plans and sections of the Manchester and Leeds Railway from Manchester to Normanton, about 50 miles. These latter are not quite finished, but will be so before the close of this meeting. Enlarged sections of a considerable portion of the excavations on this railway are filled up with the geological details.—4. Enlarged sections of the excavations on the Glasgow, Paisley, and Greenock Railway, several miles, with the geological details.—5. The same from the Manchester and Bolton Railway, a few miles; containing full details of the strata where the remarkable fossil-trees were found, and of the trees also, models of which are in the exhibition-room at the Royal Institution in Manchester. The liberality of this company will afford several opportunities for the members of the Association to visit these trees, and the particular profiles of the excavation where they are will remain in the geological section, or in the Royal Institution where the models are.—6. Enlarged sections of the Hull and Selby Railway, several miles, with the geological details. Some other enlarged sections are stated to be preparing for the committee, but they have not come to hand in time for present use. These records, according to the directions of the Association, will be deposited in the Museum of Economic Geology in London, where they may at all times hereafter be usefully referred to. In conclusion, the committee cannot refrain from observing that the documents thus collected are equally important and interesting to the philosopher, the geologist, and the engineer. To the philosophical or theoretical investigator they present the curious and various features of the crust of this portion of the globe; to the practical engineer they offer a memorial of the experience of the profession, whence many a serviceable lesson for future operations may be learned, whereby difficulties and expense may be hereafter avoided and diminished, and from which valuable information may be derived for the appliance of materials in constructions,—it being one of the great arts of the engineer to avail himself of the most immediate natural resources which he has to displace in one instance, and to apply them usefully in another, when in juxta-position. And, on the other hand, the minute variations of strata and soil thus accurately delineated, and referred to well-defined altitudes with respect to the general surfaces of the ocean, become of the very highest

interest to the geologist, and no less so to the mining engineer, more especially on the lines of railway intersecting the coal and mineral districts, wherein numerous instances of labour directed by science and sustained by commercial enterprises, has laid bare in deep chasms the secrets of nature, and the stores whence this country has derived so many advantages, and whence well-directed energies have drawn, from our mines of coal and rude metals, that abundant wealth and prosperity which the more splendid productions of Potosi and Mexico have failed to bestow on their possessors.*

2. Mr. Bateman explained his self-acting weir, of which a model was on the table. The objects were, to act as a self-acting waste-weir and scouring-sluice, in order to prevent the inconveniences now experienced from fixed weirs, in stopping the channels of navigable rivers, and flooding the adjacent country. By his ingenious invention, adjusted to the action of high and low-water, by means of moveable gates and other contrivances, he had provided against these "accidents by flood," &c. and especially provided for scouring the bed of the river by an opening in the lowest part of the weir. In a conversation which ensued, it was suggested that it would be essentially necessary in such a weir to protect it from being infringed on or choked by trees, &c. brought down by the stream; and the leading engineers present, complimenting the inventor, and mentioning something of the same kind in the side-sluices of the great canal at Amsterdam, expressed a desire to see his design in practical use.

3. Mr. A. Liddell, of Glasgow, read the paper on the ventilation of houses, which had been adopted with perfect success in that city. This mode of ventilation, which consisted in drawing off the foul air from each room by a pipe leading to the chimney of a steam-engine, had been attended with the most beneficial results as regarded the health of the inmates, and particularly by a great diminution in the number of fever-cases. A similar plan had also been applied, with the best results, to the cabins of the Princess Royal steamer, which plies between Glasgow and Liverpool. Sir John Robison observed, that it was highly satisfactory to find sound principles in regard to ventilation making their way amongst the people of this country; but it was at the same time to be regretted that ineffective plans should be resorted to, when the very best plans had been many years before the public. The mode of ventilating the Derby Infirmary devised by Mr. Strutt, and published by Mr. Silvester more than 20 years ago, had exhausted the subject of ventilation.

4. The last paper, by Mr. Vignoles, "On the Axles of Locomotive Engines," is of great and general public interest. The fatal results of the late terrible catastrophe on the Paris and Versailles Railway, and of the one that occurred on the London and Brighton Railway soon after the first opening, have attracted the attention both of the public and of engineers. The same causes were in operation, and greatly aggravated the sad results in both instances, viz. the coupling two locomotive engines of unequal power and of different constructions, the smaller in advance. On both occasions a long train of heavily laden carriages was moving at very high velocities on a falling gradient. On the occurrence of the accident to the smaller engine in front, the driver suddenly turns off the steam; the man in the larger engine behind, from whatever cause, does not act simultaneously; and a few seconds' continuance of the vast unchecked momentum of the heavy engine overwhelms the smaller machine, and the whole train between is overthrown. It is scarcely possible to regulate this unity of action, more especially with locomotives of unequal size and construction.

As respects safety to the travelling public, Mr. Vignoles, in common with a great many engineers, who are not manufacturers, states, that there is no material difference between the four-wheeled and the six-wheeled locomotives; but that the consideration most generally influencing the selection is, that of the distribution of the weight of the machine so as to impinge less injuriously on the rails; and it is well understood, that the system of the double trucks, or eight-wheeled supports for locomotives, tenders, &c., as adopted on the American railway, has been introduced on this principle, the rails and upper works in that country being in general much lighter than with us.

The real and important point, and which seems to have been quite lost sight of in the vivacious discussions, on what might be called the minor question of the number of wheels, was, whether the cranked axle for the driving-wheels of locomotive engines ought not to be abandoned, and whether driving-axles should not always be made straight. The extent of prejudice in favour of cranked axles was most extraordinary. The very great increased expense incurred in making and strengthening them, the additional complexity and cramping into narrower space of all the moving parts of the machinery, and the consequential wear and tear, and inconvenience involved by their use, to say nothing of the augmented risk, far overbalanced, in Mr. Vignoles' opinion, any theoretical advantages alleged in their favour; but which advantages and superiority in practice, over the straight-axle engine, he could never discover, and wholly denied eight years since. After a hard struggle with the manufacturers, straight-driving axles were adopted for the locomotives on the Dublin and Kingston Railway. On that line, especially on Sundays and holydays, the traffic was quite equal to that on any railway yet open. Trains of from twelve to fifteen carriages (but with one engineer only) were at such times sent every quarter of an hour from each end of the line; and there had been no instance of accident from any cause connected with the form of engine or axle, or with such frequent departure of heavy-laden passenger-trains; and the finance-accounts of the company shewed that the cost of locomotive power, repairs, &c., was below that of any other lines using cranked axles; nor did Mr. V. know of any cause of objection to the straight-driving axle, after seven or eight years' experience of their use, without, he believes, a single instance of failure, — which fully justified his opinion of their superiority. Mr. Vignoles, on other railways, has not always been so fortunate as to have succeeded in banishing the cranked axle. But he had reason to believe that several engineers of the highest standing were becoming converts to the straight axle, and congratulated the public on it as a very important step in the right direction.

In respect to the attention to be paid to the manufacturing of axles, it was impossible to pay sufficient regard to their importance,—that the scrap-iron should not only be of very good, but also of exactly similar, quality; and that each scrap should have gone through the same processes in its previous different stages. On this subject he hoped some of the experienced manufacturers who were present would throw some light, especially on the details; for on the abstract principle there could be no dispute, although he suspected that this point was greatly neglected, particularly in ordinary carriage-axles, &c., and probably only scrupulously attended to in forming the driving-axles of locomotives. Some of the French engineers, however, had, within a very recent period, suggested that the causes of the often-unexplained rupture of axles should be sought in another way. M. François and Colonel Aubert had both lately read, at the Royal Academy of Paris, papers on the subject; and they attributed the cause of the fracture of the axle of the engine on the Versailles Railway to the iron having been crystallised from the action of heat, or magnetism. In support of this opinion, it was stated that the axle broken was found of the best iron, and was of sufficient dimensions; and that the fracture had a decidedly crystallised appearance. Mr. Vignoles had often observed the same characteristic in broken axles, so much so as to induce him to fancy sometimes that they had been formed of cast-iron.

M. François stated in his papers that he had made a long-continued series of experiments, and had observed that a magnetic action on iron in a state of fusion would produce similar effects, and change the small and closely adhering particles into coarse and large crystallised grains, depriving the iron of its compact character. This distinguished mineral engineer inferred, that the action of heat upon axles moving at high velocities might produce the same effect. Both M. François and Colonel Aubert seemed to be of opinion that the only real precaution was, to change the axles of locomotive engines so frequently as not to give them time to undergo the crystalline change: suggesting, however, that iron that had been previously worked up should alone be employed for axles, and not new iron, which had more of a vitreous character, and was more susceptible of crystallisation. Since this paper was prepared, Mr. Vignoles had reason to believe that this crystallisation of wrought-iron had been noticed by some of our eminent manufacturers, whose opinions there might be an opportunity of obtaining; and if it were as Mr. Fairbairn informed him, that cold swaging would crystallise hammered iron, the shocks that locomotive engines sustained in their rapid transit might well be put as a great cause of this remarkable change.

It is, however, clear, that to remedy and replace straight axles was much easier and cheaper than to deal with cranked axles; and he ventured to state it as his humble opinion, that much ingenuity and talent was thrown away in arranging locomotive engines with cranked axles, and in perfecting the manufacture of these crooked billets, as there was in rolling iron into undulations for fish-bellied rails, which are now about as much forgotten, as he doubted not the cranked axles for locomotive engines will some day be.

Sir M. Brunel stated, that he had been involved in a railway-accident at Rugby, in which two or three axles were broken; and he had observed, that the fractures exhibited a crystalline appearance, more like that of cast than of wrought-iron.

Mr. Hodgkinson said, that some of his experiments on cast-iron tended to shew, that a force which would produce a very slight deflection in a long bar would to some extent impair its elasticity, and prevent it from resuming its former shape, which seemed to prove that there was some change in its internal structure. His experiments were certainly made upon cast-iron; but he had reason to believe that the

* A discussion of great utility followed on this important subject; for which we shall endeavour to find room hereafter.

same results would be experienced with respect to wrought-iron.

Mr. Fairbairn observed, that it was a fact well known, that if iron bars were swaged below a blood-red heat, the iron would become crystalline, however fibrous and ductile it might previously have been.

Mr. Hawkins mentioned that, at a recent meeting of the society of Civil Engineers, a very interesting paper had been read on this subject, and numerous specimens of fractured iron had been exhibited, which, though undoubtedly fibrous originally, had become decidedly crystalline by use.

Sir M. Brunel observed, that any one who considered the ordinary motion of a railway-engine or carriage at a high rate of velocity would see that the axle must receive an immense number of blows, like blows upon an anvil, and which would probably have the same effect upon the texture of the iron.

Mr. J. Garnett said, it was well known that violent hammering or friction rendered iron magnetic, causing it to attract iron filings very freely; and it would probably be found that in all such cases there was some change in its molecular arrangement, similar to that described in railway-axles.

Mr. J. Nasmyth confirmed Mr. Fairbairn's statement as to the injurious effects of swaging or hammering when iron was nearly cold, and suggested that the only safe course was to have all axles annealed after forging, by which the injurious effects of injudicious workmanship would be entirely got rid of.

The Chairman inquired whether Mr. Nasmyth supposed that annealing would remove the crystalline texture resulting from use, and restore the fibrous texture of the iron.

Mr. Nasmyth said he had no doubt it would have that effect. He then made some very interesting observations on the absence of oxidation from those iron rails of railways on which the traffic was only in one direction, and observed, that on the Blackwall line, where the trains travelled backward and forward on the same line, the extent of oxidation was very striking.

After some further discussion, in which Sir J. Robison, Mr. Grantham, Mr. Lucas, Mr. Burdekin, and several other gentlemen, took part, there was a pretty unanimous expression of opinion, that the subject was one well deserving investigation; and that the funds of the British Association could not be better employed than in defraying the expense of a series of experiments on a point so interesting to scientific men, and so important to the public.

THE GENERAL MEETING,

Thursday Evening,

Was held in the Meeting-house of the Society of Friends, a large and commodious building, curiously divided, by a transverse barrier, into two parts; and at the upper end what was called "The Preachers' Gallery," where a number of the officials of the Association, who had to act on the occasion, were ranged.

Mr. Whewell opened the proceedings soon after eight o'clock, by a speech which seemed to afford little satisfaction to his brother associates who have taken an interest in the progress of the Society. After some explanatory remarks, as to the order of business, he said—"My duty now is very brief and simple. It is merely to hand to my successor the torch of knowledge, which you commit to us, which we hand to one another, and which derives all its powers of illumination from your exertions and your talents. I have often thought, in seeing this office transmitted in this manner, in having unexpectedly received it myself, and and in now transmitting it to my successor, I might say, in the words of the poet—

'Et quasi cursores vitaï lampada tradunt:'

which I may alter to

'Et quasi cursores musarum lampada tradunt,'

which, if you will allow me to offer a translation, as ladies are present, I would say,—

'As in the torch-light of the Grecian youth,
We pass from hand to hand the lamp of truth.'"

As he had now filled all the various offices of the Association, it was impossible that he should not look with no small degree of interest to its future fortunes. It was impossible that he should not feel some anxiety in glancing into its future, that he should not wish to know in what respect it might resemble or might differ from the past. During the period which had elapsed since the formation of the British Association, it had successively visited York, Oxford, Cambridge, Edinburgh, Dublin, Bristol, Liverpool, Newcastle, Birmingham, Glasgow, Plymouth,—great cities, powerful and opulent, among the greatest in the empire—and it was now held in Manchester, inferior in these respects, we might say, to none. In this manner, the British Association had gone through a great number of the most prominent and distinguished towns in the empire; and as long as the Association came to such places, its members were sure to find persons who would share in and take an interest in their labours. An abundant number of persons would be found ready to engage in those laborious offices which were necessarily connected with the preparations for the reception of the Association, and the rendering of their proceedings agreeable and useful. And when the Association left this town for another, they would go with a feeling which he ventured to express, on dissolving the last meeting at Plymouth, "To-morrow to fresh fields and pastures new." But the number of towns so circumstanced in the empire was limited; and if they looked forward to the time when such pastures began to fail—when there were no opulent cities able thus to receive us, which were not visited before, the Association were naturally led to inquire what was the course it should then take. It appeared to him that there were three courses open to them. After visiting all the great towns, the Association might then go to towns of a smaller size, which might derive their power of receiving them, not only from themselves, but from those districts which they represented; or the Association might return to those towns in which they had already held their meetings; or it might be found convenient to suspend the proceedings of the Association for a year, and look forward to some future course. He wished it to be understood, that, in making these observations, he spoke as an individual, and without the sanction of any official persons. He trusted that his views, thus briefly expressed, would be accepted as an evidence of the strong feeling and anxiety he had with regard to the future prospects of the society. In following out their original intentions, the society would continue to visit new places as long as possible, and thus to make known to others the merits and labours of eminent scientific men in the provinces, who had previously been in comparative obscurity. No doubt, there would be many difficulties in the way, but they would all be overcome; the modes of proceeding of the Association were not so inflexible as not to admit of adaptations according to the circumstances of the place. With regard to their returning to places where they had already been, that course should be, of course, delayed as long as possible. Perhaps in this respect an exception might be made of that city which might be looked upon as the mother of the society, and which might naturally feel an anxiety at no distant period again to see her offspring; after looking on its birth with all a parent's natural solicitude, it must have a desire to see her child, who had been so well received in every part of the empire, coming back full of life and vigour, and laden with honours, to gladden her eyes. With regard to the third course—the having the activity of the Association suspended for a time, he saw no evil in it. This, however, was an event which would not arrive for many years; and the more remote the contingency was, the better satisfied should he and all the friends of the Association be. The Association had accomplished much of what it had, at its formation, proposed to itself: no one now could say that Englishmen were not aware of the state of science on the Continent, and had not done what they could to advance science in their own country. But that was no reason why they should not go eagerly on; and he for one should be ever ready to do whatever seemed most likely to carry them in the advance. [The speaker expressed his personal pleasure in this revisit to the scenes near which his childhood was spent; and warmly eulogised Dr. Dalton.] They felt, in the veneration which they entertained—and which they knew the whole world entertained—for him, a pledge of the dignity and the purity of that love of science and veneration for science which brought them together. Nothing now remained for him but to resign his chair to his successor; and he hoped he might be allowed to express the gratification he felt in resigning the sceptre with which he had been invested into the hands of one so accomplished, and so well versed in literature and art—one in whose occupation of the first seat of the British Association for the Advancement of Science they might see a recognition of the bond that binds together all branches of literature, and all departments of human cultivation. He hoped he might be excused for recalling to the recollection of his successor a portion of his classical studies:—

"Me vero primum dulces ante omnia Musæ,
Quarum sacra fero ingenti percussus amore,
Accipiant, cœlique vias et sidera monstrent;"

which he might translate thus:—

"Him who has loved the Muses well and long,
And won their smiles in fields of art and song,—
Him will they welcome in that skyey zone
Where stars and worlds no less their empire own."

Lord F. Egerton stepped into the vacated chair, and immediately called on the treasurer for his report; and it had a laughable effect, after Mr. Whewell's classical peroration, to hear Mr. John Taylor's voice (within a few seconds) uttering the words, "Three hundred and sixty-seven pounds, three shillings, and *ten pence*," the balance in hand from last year's accounts. The other items of finance stated were,—life-compositions and annual subscriptions at the meeting at Plymouth, 1,131*l.* 1*s.*; ladies' tickets there, 261*l.*; compositions from members for the delivery of future volumes of the Reports, 513*l.* 2*s.*; half-year's dividend on 6,000*l.* in the three per cent consols, 90*l.*; proceeds of the sale of 500*l.* of that stock, 452*l.* 1*s.*; for reports sold, 89*l.* 3*s.*: making a total of receipts of 2,903*l.* 10*s.* 11*d.* The payments were,—for the expenses of the Plymouth meeting, and sundry disbursements, 321*l.* 15*s.* 3*d.*; paid for printing and engraving the volumes of Reports, 288*l.* 3*s.* 4*d.*; salaries of the assistant-general-secretary and the accountant, 305*l.* The total of a long list of payments to the

scientific grants, 1,449*l.* 17*s.* 8*d.*; balance in the hands of the bankers and local treasurer, 538*l.* 14*s.* 6*d.* The property of the Association consisted of that balance; 5,500*l.* in the three per cents, valued at 5,018*l.*; and the value of the stock of books on hand, estimated at 1,130*l.*: making the whole property of the Association 6,687*l.* 9*s.* 6*d.* Since their arrival in Manchester, 771 tickets had been taken by new and old annual members, for which 1,396*l.* had been received; and 265*l.* for ladies' tickets (1*l.* each); making the total amount received in Manchester, 1,661*l.*—The chairman then called on the assistant-general-secretary for his report.

Prof. Phillips observed, that as to the working of the body, in regard to the advancement and promotion of science, there would be no material change; it had been gradually improved, and at present, within the limited period of six working days, it did not appear capable of any considerable change for the better. On this occasion there had been great success in the preliminary arrangements for this meeting. If there should be a material failure in any part of the arrangements for this meeting, he should be greatly distressed; but they were all greatly indebted to the local secretaries and officers, whose arrangements had given such satisfaction in the sections to-day to all the members. It would be a painful feeling on the part of many persons, if they thought they were not to visit again more than once, indeed many times, the places where they had derived so much gratification at these meetings.

The President now addressed the meeting in the following speech, which was often interrupted by enthusiastic plaudits:—

"Gentlemen, as your late president has informed you, eleven years have passed since the great prototype of this meeting was held at York; and such was its success, that, as you know, the experiment has been annually repeated ever since, and with similar and augmenting results." His lordship then referred to the practice of the president of the year giving on these occasions a summary, brief but instructive, of the state of science as connected with the past and contemplated proceedings of the Association,—which he said was, however, inconsistent with its other practice of admitting to the temporary honour of its president an individual selected like himself, not for any scientific pretensions, but solely from the accident of local connexion with the place, rather than with the objects of the Association. "I cannot forget, I wish you could, under what auspices the last meeting at Plymouth was held; I cannot be unconscious of the fact from whom I have on this occasion received the seat which I have now the honour to fill. Could it be forgotten, it were hardly to my interest to awaken the recollection of the fact, that Professor Whewell filled at Plymouth, last year, the situation which I have the presumption to fill at Manchester. If I do so, it is only for the purpose of observing, that if he who has 'run through each mode of the lyre,' and proved himself to be 'master of all,' should express his sense of the difficulty of endeavouring to convey to a mixed audience, within the limited time allowed him, such a summary view of the state of science, it would not be for me to make an apology for not imitating his example, but rather to call upon the council to give reasons for not calling upon some other functionary of the Association immediately to execute that purpose for which I am so utterly inadequate. Some observations, indeed, before I sit down, I may allow myself, which I consider illustrative of the advantages of the society, and of the reasons which have impelled me, and many others similarly situated to myself, to give whatever feeble influence we can to its proceedings. But, before I proceed to such topics, allow me to indulge for a moment in the expression of my feelings of satisfaction upon the subject of the locality which sees us assembled on this occasion. On this subject strangers and guests will excuse me, inhabitants will sympathise with me, if I express some feelings of complacency upon that topic. It is not merely that the place which sees us here together has from various causes attracted to itself, as to one of the principal centres in the world, so vast an amount of mechanical skill and invention,—it is not merely that a neighbourhood so rich in mineral treasures offers in itself attractions to the followers of many most important branches of natural science;—there is another reason, equally weighty, I think, and upon which I dwell with even greater satisfaction now. It is because this town is the birthplace, and is still the residence, of one whose name is mentioned with the greatest respect in whatever part of the civilised world knowledge is cultivated—one whom I am happy to see here to-night near me, to enjoy the honours which he has won by a life of persevering exertions in the cause of knowledge; and I beg him to accept from myself, if he will condescend to do so, the expression of my most sincere regret (and no one here can feel it more than I do), that the increase of years, which to him has been but the increase of wisdom, should make him, with reference to his physical strength, reluctant to fill an office which in his case would receive more honour than it could confer. I do regret, that from this, or from any other cause, such an assemblage as this, within his native town, should miss the opportunity of being associated with the honoured name of Dalton as its president. The council well know my own views and feelings on this matter, and that, if my humble services could have been available, I would gladly have served as a doorkeeper in any house in which the father of science in Manchester was holding the office of president. I must offer this apology for my occupying this situation, that I may at least do no prejudice to the cause which we are met to support. To those who have originated this institution, who have tended it from birth, who have watched it from its cradle at York to its vigorous maturity at Manchester, who manage its affairs and regulate its proceedings, and who have called upon me to occupy this chair,—I respectfully leave the task of my vindication. In addressing you upon any topic connected with this society, I can only do so in one manner. All readers of German literature, and works of science, cannot have failed to notice the frequent recurrence of the word *Standpunct*, which signifies the place from which the speaker or writer views the object which he is discussing. My position in reference to this Association is dim, indistinct, and shadowy. I am not even a proselyte of the gate, far less a Levite or a priest of the sanctuary; my lips cannot pronounce the shibboleth of the temple of science; and though I would fain worship at a distance, yet the sound of the ritual falls too faintly on my ear to allow me to join in the service of the altar. Yet I can approach the edifice near enough to know that the architects are busy, that the builder is at work; I hear with you the clink of the hammer and the trowel. The pile is a vast one; but what man shall ever call that pile complete? Many a shaft remains yet to be polished, and many a capital to be elaborated into new forms of fitness and beauty. The architects are now busy on that ground where Bacon shaped the rugged top of that Moriah of philosophers, and smoothed the way, removing the rubbish of centuries, and shaping it into a vast, splendid, and solid basis for the subsequent discoveries of Newton and his followers. I hear the sound of their labours; but it is not for me to attempt to instruct you in that of which I am ignorant,—the progress or the details of their labours. These are points which you will learn in those sectional departments into which the builders have wisely divided themselves. There the electrical inquirer will be enabled to learn into what new shapes and channels his fellows are directing that subtle fluid which Franklin snatched from heaven; and what forms they have compelled that Proteus to assume whom they have enslaved to do their bidding. Mr. Lyell, I believe, is still pursuing his investigations in the remoter regions of the New World; and my friend Mr. Murchison has returned rich in treasures from his travels and researches in an important part of the Old; and returned to tell you of the favour which he received from the sovereign of those vast dominions. With the power, the schemes for conquest, or the military projects of that monarch or any other sovereign, we have nothing to do; and our thanks are justly due to him for the homage he has thus rendered to science. '*Quid bellicosus Cantaber aut Scythus agat*,' is no topic for us; but it is a topic for the just acknowledgment of our gratitude, that our friend Mr. Murchison should have received from the sovereign of those vast realms the reception by which he was entertained, and which stamps that sovereign as the friend of science. The communication and discussion of such past achievements and researches as these, is one of the useful and legitimate objects for the operations of the society. Fortunately, we are now arrived at a period of the society's operations when it is not incumbent upon us to shew something of the probability of prospective advantage from its continuance. It might be well for those who originated its operations to make out their calculations and estimates, as you do in one of those schemes for carrying a new railroad through the country; but we have at least arrived at a period when we are able to shew, not calculations and estimates, but profits and dividends. It was easy to foresee and to foreshew, that from the opportunities for mutual discussion between persons resident in different parts of this country, and in different countries of the globe,—that from the collision of such minds light and heat would probably ensue;—it was easy to predict, that from the nomadic principle of this society (if I may use such a term) the light of science would be carried, in its brightest and purest form, into those parts of the country where it has hitherto shone with comparative faintness. All this was easy to predict; and fortunately it is not difficult to shew, that those predictions have been more than accomplished in many most important points. It was observed last year by my predecessor in the chair, and I believe it has been remarked at meetings on former occasions, that up to a recent period, of all the main branches of natural science, astronomy was the only one which had received the direct and permanent assistance of governments, and, if I may use the expression, had enjoyed in general the patronage of society at large. It was well that precedence should be accorded to that most sublime and most ancient branch of natural science; and there are other reasons which, in this maritime country, most

undoubtedly recommend it to that especial patronage of government. Of Astronomy we may say, gentlemen, that it was well she should walk first; but not that she should walk alone. There are many other branches of inquiry which stand much and equally in need of the assistance of the state, of combined operations on the part of individuals, and of assistance in respect of pecuniary support. Now, the details are quite beyond my province to state to the meeting; but it might be most satisfactorily shewn to any assembly, that in these respects this Association has been of the greatest service. There are many subjects on which its advice has been received and followed,—many objects for the promotion of which the assistance of its funds has been accepted; and on these points it may be most satisfactorily shewn, that this Association has been of the greatest direct and practical service to the cause of science in this country. Astronomy, I have said, took precedence of other sciences, especially in the favour of governments and nations; and undoubtedly now, the connexion between astronomy and the government, between Greenwich and Downing Street, is founded on the most solid foundation. But it has not been always that Astronomy has so won her way to favour in the courts and councils of princes. I believe she once owed that favour to the respect then entertained for the claims of judicial astrology. But astronomers do not now point their telescopes, as Wallenstein did, to the heavenly bodies, in order from them to read the mysterious future. The English soldier knows but one Homeric omen,—that the defence of his country is the performance of his duty. Some two centuries ago, and I believe Mr. Airy might have been distracted from his more important investigations and calculations, to mark what star was culminating on such occasions as the birth of a royal infant. We do not now watch the configurations of the planets on such events; but to that Providence which has shielded the mother, and to the prayers unto that Providence of a loyal people, we cheerfully confide the faith and fortunes of the infant hope of England. The sun of science has drunk up all those delusions; but, as I have said, substantial grounds still remain, why that connexion between science and the state should be powerfully exemplified in the case of astronomical pursuits. Even here this society has not been wanting in its assistance. I believe that no scientific labour of more importance (as I am informed) has been suggested or exercised, than the reduction of the observations at Greenwich, which have been going on at the expense of this society; unless it be those equally important, which have been suggested to government, to support at its own expense,—following therein the example and the suggestions of this institution. Upon this subject, if I needed any confirmation, I believe, at a subsequent period of this meeting, I might enjoy the opportunity of appealing to the greatest authority on such subjects that continental Europe can produce; for I find the authority of Professor Bessel (who is not here yet, but who is expected), whose opinion on the records of this society is expressed in the strongest manner with respect to those very observations of which I speak. Should that eminent individual arrive here, as I understand is expected, in company with Sir John Herschel, on Monday, it may be said that few railroads have had a more important trust confided to their charge than the London and Birmingham Railway will have on that occasion. It is an old saying of Adam Smith's, that, 'of all luggage, man is the most difficult to transport.' It is very fortunate that the difficulty is not commensurate with the value of the article; for if it were, whatever power of invention and mechanical skill my friends Sharp and Roberts may possess, I doubt if they could construct a locomotive that could drag those two eminent philosophers to Manchester. You are well aware, that of Sir John Herschel it does not become me to say one word in any British assembly; of Professor Bessel, you are well aware, that he, by all the astronomers of Europe, is said lately to have achieved one of the greatest triumphs of astronomical science—the accuracy of whose observation and the grasp of whose calculations enable him to overleap the bounds of our visible celestial system, and the orbit of Uranus, and to calculate the parallaxes and distances of some, at least, of those remoter bodies, whose distance mocks our powers of contrivance to magnify their bulk to our vision. I have only to express my regret that it is not in my power to give him that welcome which I am sure this meeting would bestow upon the presence of so eminent a man. The connexion between science and the powers of the state is a matter of more importance and difficulty than I can enter into upon this occasion; but I think I can shew additional proof,—besides the mere brief reference to past transactions, to that magnetic expedition which is now proceeding, originally at the suggestion of this society, and at the expense of the government, and beyond the fact of this society's operations, particularly the survey of the kingdom now proceeding, which has been, as to this part of the kingdom, extended in its scale, almost entirely in consequence of the movement and impulse given to the government in that transaction by the same body; but I allude to a more recent instance—to shew, that the connexion has been established in a striking manner, and upon what I think a sound footing. I wish to see science connected with government, not in any low or dependent form; not under the undue control of government; not dangling in ante-chambers, or sweeping the dust from the floors of public offices or palaces; but seeking, receiving, and requiting with usury, the occasional assistance of government; enjoying a liberal degree of favour and good will from the powers of the state. It is known, I believe, to most of you, that recently a building which has been left useless, which was formerly appropriated to the purposes of science, was at the disposal of the crown. A suggestion emanated from this society, that it might be of service,—of far more important service than is even now contemplated,—that it was a building which might serve as a situation where your instruments may be preserved and compared, and for various other uses applicable to various branches of science. I am happy to say, that the sceptre was promptly and graciously extended towards us, and that the observatory at Kew is now at the disposal, and will shortly be in the use, of the body which I have now the honour to address. On looking through the Transactions for the year 1839, I was struck by a passage which seemed to be very illustrative of the practical effect of your proceedings; for, in the preliminary passage of Prof. Owen's treatise on the fossil reptiles of this country, he distinctly states, that, but for the co-operation and assistance of this society it would be impossible for one man to have embarked in that subtle and laborious task, which he had since so ably executed and performed. I ask you to look upon the pages which form the commentary upon that text. It is a subject which unlearned men like myself may all partially bring within their comprehension; it does not involve those trains of algebraic formulæ which puzzle the uninitiated, or those symbols which, to such as me, are nothing more than hieroglyphics;—you will there follow Professor Owen through the relics of former worlds; you will see how he marches with order and arrangement in his train; how the dislocated vertebræ fall into their places; how the giants of former days assume their due bulk and dimensions—some of them shorn, perhaps, of the proportions which, on their first discovery, were attributed to them, and some enlarged;—peruse that work, which tells you that it owes its existence to the encouragement given by this Association, and I say, that on the pages of your own Transactions you have proof enough, that the operations of this society have not been ineffectual or useless. Before I sit down, I would endeavour to illustrate my feelings by reference to another scientific transaction. About two years since, an adventurous party, of which Prof. Agassiz was at the head, achieved the ascent of one of those Alpine heights which, as its very name implies, had for ages been supposed inaccessible to the foot of man. It is probable that there were many who, from the *chalets* and the pasturages below, directed their telescopes to those dizzy peaks of ice, with the warmest interest in the safety and the success of those adventurers. Perhaps there were some who, by trifling incursions into those regions, had learned to understand and know the difficulties of progress in those higher Alps,—who knew something of the dangerous crevices—who could tell of the ascent, cut step by step with hatchets in that precipice of ice, and who could appreciate the adventurous magnitude of the enterprise. Be assured, you climbers of the heights of science,—and there are many of you here,—that there are those below who sympathise with the efforts which they cannot share or emulate—who rejoice in your success—who lament when you are baffled; and, when you plant your flag upon some hitherto virgin summit, their shout of applause would reach you from below, if it could be conveyed to your organs by the pure and attenuated atmosphere which it is yours alone to breathe. Dwellers in a dull valley, as we are—breathers of a heavier, and too oft a tainted, atmosphere—we can yet look upward. We count your triumphs; and, as you gain them, we gladly place your names on the list of the recorded benefactors of mankind; for it is the privilege of triumphs like yours, that though they become common property, though they extend advantages wherever civilisation extends over the habitable world, yet at the same time, and for that very reason, they exalt the country from which they originate in the scale of nations, and fulfil the most rational feelings of national pride, while they perform the obligations of our common humanity to the most unrestricted extent."

Mr. Murchison, as an old soldier of the British Association, energetically acknowledged the force of this address; and said, "I have always felt, that during the progress of the Association a time might arise, when some one, combining in his own person scientific and literary attainments,—scientific I say, though the noble lord does not choose to acknowledge acquirements of this sort,—united to public station, might become to be the fittest person to preside over us. How truly this anticipation has been verified, the success of this meeting has amply shewn. The statements which you have just heard from the noble lord must have a great effect on the country. Coming from such an authority, they must have greater

influence than from any humble scientific individual. After the advice we have just heard from the noble lord, I think we are bound to express our gratitude for his speech. I move, therefore, that the thanks of the Association be given to Lord Francis Egerton for the able and enlightened discourse he has this day given us."

The Marquis of Northampton: "I rise with great pleasure to second the motion. It does not require one word from me to recommend it; but, having attended a great many former meetings of the Association, I may be allowed to express the great satisfaction with which I have listened to the speech of my noble friend to-night. My noble friend has alluded to classical authorities; and I may say, that as long as we have presidents like him who has just addressed us, if ever it should be the fate of the Association to die, our memory will be *cara vati sacro*. But I am certain that the British nation will never allow the British Association to die—nay, that they will not allow its existence to be suspended even for one year. I agree with your late president, that as long as 'fresh fields and pastures new' invite us, it is our duty to go to them, with due consideration of the convenience of the Association. And whenever the time comes that we have completed our cycle, I am sure there is no place that has received us before that would not be glad to receive us again—(*applause*). I have said this at former meetings of the Association, and it has been always responded to as you have responded to it. It is now five years since the Association was requested to come to Manchester. Your venerable fellow-citizen (Dr. Dalton), the father of science, not only in Manchester, but in the kingdom, came five years ago to Bristol to urge us to come to Manchester. It is only candid to say, that I opposed your claims—(*hear*), because I thought it better at that time that we should go to Liverpool. The invitation was repeated again and again, and here we are; and now I anticipate that that application will be repeated again and again until we come here a second time—(*applause*). I do not say, for the purpose of enlisting your assistance and co-operation in the great work in which we are engaged, that you are thereby conferring a benefit on humanity; but I say to you who depend on commerce, on manufactures, and on your mechanical skill, that the cultivation of science is of the very utmost importance to your existence; and that it is only from following up inquiries, and pursuing studies of this description, that your town, as well as other towns of this empire, will continue to flourish. If, however, England allows other nations to get the start of us, while we lie slumbering in our beds, Manchester and other towns like it must be destined to utter ruin. My noble friend has mentioned the extended—I may say gigantic—inquiry now going on in different parts of the world in the shape of magnetic observations. I believe these are at this moment going on in not less than forty observatories—[A Member: "51"]—in different parts of the world,—a portion belonging to this country, and the rest to other countries. I have the satisfaction to inform you, that her Majesty's government have consented to continue these magnetic inquiries for three years more. Another subject connected with this has been adverted to—the kindness shewn to science by the Emperor of Russia. I may state upon this, that when I waited on Sir Robert Peel, on the part of the Royal Society, my companion was the ambassador of Russia. Having taken an active part in furthering these inquiries, the emperor desired his ambassador in this country to make these representations in favour of continuing them. I thought it best that we should go together, and thus exemplify the important truth that science is a bond of union among all nations, and the best promoter of peace and amity—(*applause*). I cannot help saying again, although I have said it before, that it is important to the progress of civilisation, of humanity, and peace, that nations should feel a common interest in pursuing together those scientific inquiries in which they have a great common object. I will only express a sincere hope, in conclusion, that the Association will continue as eternal as the truths it is designed to discover."

The motion was carried with applause, and the meeting adjourned to Wednesday evening.

At the adjourned meeting of the General Committee on Wednesday, Prof. Sedgwick in the chair,—Lord Francis Egerton having been obliged to proceed to London for medical aid in consequence of a severe accession of gout (brought on probably by his previous exertions when not quite well, as he appeared at the dinner),—the minutes of the previous meeting were read and confirmed. The invitations from York and Cork were next read; and their claims for the honour of the next year's meeting severally advocated,—the former by Mr. Wellbeloved, the Marquis of Northampton (who moved it), Dr. Scoresby, Sir D. Brewster (seconder, but readily withdrawn after hearing the arguments pro and con), Sir John Robison, Mr. Strickland, Mr. Hutton, Mr. Vernon Harcourt, and Col. Sabine; and the latter by Dr. Taylor (the mover, in a very humorous speech), Mr. Lyon the Mayor of Cork, Prof. Stevelly (seconder), Sir W. Hamilton, Sir T. M. Brisbane, Mr. Patterson of Belfast, Sir W. Jardine, Mr. Webb Hall, Mr. Scott Russell, and Col. Sykes. It was evident that the sense of the majority was in favour of "justice to Ireland;" and Mr. Murchison suggested the withdrawal of the original motion, to which the Marquis of Northampton having acceded, the visit to Cork was carried without dissent.

Mr. Jerdan had been requested to deliver a message in favour of the town of Hull, which had formerly sent deputations to invite the Association thither; but, in consequence of no hope being held out of a successful issue, had not continued to prosecute the hospitable intent. He was glad of the decision just come to, which would probably encourage that place to renew its invitation, if there were any prospect of its being well received; and thus other large towns be led to follow the example.

Adjourned to Wednesday.

On which day the Committee re-assembled, and the officers for the ensuing year were elected, on the motion of the Marquis of Northampton.

President—The Earl of Rosse.

Vice-Presidents—The Earl of Listowel; Viscount Adare; Sir W. Hamilton; and Professor Robinson, of Armagh.

Local Secretaries—Professor Stevelly; the Rev. J. Carson, Trin. Coll. Dublin; and William Kelleher, Esq., one of the deputation from Cork, who, with his colleague, exerted himself zealously on behalf of their mission.

Treasurer—James Roche, Esq., banker.

The standing officers of the Association were all re-elected, and the new council of 25 members with little alteration.

Some amicable discussion followed, which, however, we must defer noticing; and we also postpone the particulars of the grants for the ensuing year, recommended by the various sections, viz.

In A	. . . . .	£171*l*
B	. . . . .	150
C	. . . . .	360
D	. . . . .	322
E	. . . . .	80
F	. . . . .	150
G	. . . . .	565
Grand total	. . . .	£3338

The recommendation for scientific researches without money-grants was also read and approved of; and from a statement of accounts by Mr. J. Taylor, the treasurer, it was shewn that the total receipts in Manchester were 2032*l*. which would probably be augmented by other incidental items to 2100*l*.

Thanks were voted to Sir T. M. Brisbane in the chair; and in the evening the general meeting,* over which the Dean of Manchester presided, terminated the proceedings of a week altogether very valuable as regards the progress of science, and connected with nothing but pleasing and grateful recollections of, and we trust in, the town of Manchester.

EXTRAORDINARY DISCOVERY.

THE proceedings of Section A throughout the week have been of a high order, especially on the subject and theory of light. Almost all the British writers on optics, theoretical and experimental, were present,—Sir D. Brewster, Sir John Herschel, Sir W. Hamilton, Prof. Lloyd, Prof. M'Cullagh, Prof. Baden Powell, &c. The discussions were of great interest, and new facts and new views, metaphysical and mathematical, were brought forward and struck out. For the facts we are mainly indebted to that indefatigable and industrious investigator, Sir David Brewster, as will be seen in our consecutive reports. But there was one fact stated, on the last day of the meeting, by Prof. Bessel, to have been discovered by Prof. Moser of Königsberg, of so novel and extraordinary a character, that we at once bring it prominently to the notice of our readers, in Bessel's own words.

A black plate, either of horn or agate, &c., placed below a polished surface of silver at a distance of $\frac{1}{10}$ of an inch, and remaining there for ten minutes, the latter receives an impression of figures, &c. engraved on the former, which may be rendered visible by exposing the silver plate to vapour either of water or of mercury, or &c. The image made by the camera obscura may be projected on any surface whatever (glass, silver, a smooth cover of a book, &c.) without any previous preparation; and these will produce effects of the same kind as those observed on a silver plate covered with iodine. Vapours of *different* substances are of *equal* effect (without pretending that the effect will always be permanent).

This wonderful secret and silent operation takes place at midnight as well as at mid-day, in the dark as well as in light. There, on the silver surface, is the picture, to be called into sight by a breath. Can this be photography? The image is of the same character and as perfect as that of the early daguerréotype; but it is

* We regret to say that the speeches at this meeting were almost throughout in bad taste. What will they be at Cork, so near the Blarney-stone? After three hours and a half of oratory, a poor little manufacturer, a Mr. Swabey, or some such name, though looking like an Italian, got on the *dais* to return thanks for his class, with a fearful pile of foolscap MS. in his dexter hand—and will it be believed that the cruel speakers, who had spun their own yarns at such length, dashed the cup from his expectant lips, just as he had uttered a few sentences of exordium? He descended to the floor a pale, injured, and disappointed man. Prof. Whewell's explosion on the first night, which has been a bone attacked by every speaker since, hardly produced more consternation.—*Ed. L. G.*

produced as well in the absence of light, and therefore Sir W. Hamilton suggested facetiously, as a distinction, that it be termed scotography. But Sir J. Herschel asked, might it not be thermography? He had obtained impressions at the heating end of the spectrum beyond the extreme red ray! A most animated discussion ensued, which we reserve, however, for its proper place and order.

REVIEWS OF NEW BOOKS.

Father Connell. By the O'Hara Family. 3 vols. London, T. C. Newby.

THERE are very few novel-readers, we imagine, who do not remember the Tales of the O'Hara Family. They were esteemed and took rank amongst the most popular of Irish stories, and indeed deservedly acquired many admirers. Some years have elapsed since their publication, but doubtless have not passed away without a thought having frequently recurred to the pleasure their perusal afforded, and a wish having as often resulted for another work by the same hand. This wish is now to be realised. *Father Connell*, as the title shews, is by the same author, and upholds the reputation previously gained by him of being one of the most vivid portrayers of Irish life. The new novel is Irish, and lively, and amusing, with just sufficient pathos to touch the softer feelings: its chief charm, however, lies in the sketches of persons and characters—Father Connell, Tom Naddy, Peggy, Robin Costigan, "the Babby,"—in short, each and all of the actors in the story are distinct and admirable portraits. Our extract, taken almost at random, is of "Paddy last," in the "English Academy," so written by the master, James Charles Buchmahon.

"George Booth very little resembled James Graham. He was the biggest and tallest boy in the school. In fact, he was eighteen or nineteen, and quite a giant compared with every other boy around him. Yet he never could acquire enough to entitle him to a place in the head class, and so was always a member of some inferior one, where he towered above his compeers—very little fellows indeed—like Gulliver among the Lilliputians. Still it was in stature only that he surpassed even these—ay, or even equalled them. He was always at the tail of his class, or, as the little people termed it, 'Paddy last;' and, as matter of consequence, George Booth wore, nearly from morning to night, the idler's cap—a curious head-gear enough, and of such a height as to make George seem nearly twice as tall as he really was. But all this seemed to give George very little trouble. Day after day he bore with a stolid, unwincing endurance his coronation as monarch of dunces, and the sore humiliations, scoffs, and insults, resulting therefrom. In fact, he seemed to have made up his mind that he had been sent to school for the purpose, and for no other, of wearing the idler's cap; and, as he plodded home every evening, George used to be heavily good-humoured and jocose, in his own peculiar way, as if he felt convinced that he had gone through his day's duty with consistent credit to himself. Before school broke up, each day, all who could tack words of two syllables together stood in a semicircle round the room—first, second, third, or fourth classes, as it might be. Upon these occasions, if a boy of an inferior class spelt correctly a word which his neighbour in a higher one had 'missed,' James Charles Buchmahon's discipline to meet the case was rather singular. As no member of the third class, suppose, could take the place of one of the second class, he was entitled, as an equivalent triumph over the dunce of the moment, to seize his nose between his right finger and thumb, and so lead him round the school-room. Now, it may be believed that George Booth very often subjected his organ of smell to such vile usage. But in the contrivances of the little fellow—scarce higher than George's knee—to lay hold on George's nose, much of the interest of the scene consisted. From some oiliness of surface, or else fleshy elasticity peculiar to it, the feature was very slippery; so that when the tiny boy, helped by a good jump upwards, succeeded in catching it, it would slip over and over through his fingers, until James Charles Buchmahon, to end the proceeding, would, in the calmest but most authoritative tone, direct George Booth to bend himself half double, so as that his countenance might come within reach of the pigmy aspirant; and George would quietly obey, and then be led about amid the laughter and shouts of all the lookers-on; and yet, when he was again allowed to stand upright in his class, neither shame, nor sorrow, nor excitement, could be traced in his pale, fat countenance. And so far George's character seemed legible enough. Blockheadism and insensibility to disgrace very fairly go together. But there were some points about him which no human being, not even James Charles Buchmahon could comprehend: certain dull, muddy, and it must have been unintended, quiddities, labouring, like asthmatic lungs, in the recesses of his brain—or, rather, of whatever it was which stood in the place of brains to him. For instance, he would now and then be imaginative, forsooth; but we cannot venture, no more than James Charles Buchmahon could, to define these precious portions of George's mental existence or consciousness. An illustration of them in facts shall, however, be attempted. As if beginning to grow a little tired of performing his daily duty under the edifice of the idler's cap, George, one sunny autumn morning, after breakfast, took a stroll into the country instead of going back to the English Academy; and all that day he was not to be heard of, until hunger at last drove him home to his father's house. And next day he took his place as 'Paddy last' in his class, apparently as undisturbed as if there were no reckoning in store for him, or as if there had been in existence no such man as James Charles Buchmahon, master of the English Academy; and for a time George seemed perfectly right. A good portion of the day wore on—George sat looking down on his book—his mouth, as well as his eyes, wide open, as if he were wondering at some crabbed Chinese manuscript. James Charles Buchmahon, after hearing many classes in rotation, stood, according to invariable custom, before his magisterial desk, scraping, and paring, and splitting, and nibbing pens, and placing them in most formal rows upon its outer ledge. The boys were all engaged, or seemingly so, in conning fresh tasks, until the pens should be quite ready to enable them to engage in writing their copies. During his progress of scraping and so on, James Charles Buchmahon, looking over his spectacles, and under his eyebrows, sent his searching glances round and round the room—nay, from each individual boy to the other. There was almost dead silence, as was usual in the school-room at this time every day, when the words 'George Booth,' pronounced in the slowest and most deep and solemn manner by James Charles Buchmahon, sounded through the stilly school-room. George Booth looked in the well-known direction of the summoner—his miserable features suddenly jerking themselves, as it were, from their expression of inane stupidity into contortions and twistings of a horrible kind; and his terrified glance informed him that the fore-finger of a certain right hand was slowly beckoning him up to the judgment-seat. The foredoomed wretch arose and advanced—now gulping down something every other instant, as if he were vainly endeavouring to swallow back again the sickening fears that bubbled up from his heart. 'George Booth, you were yesterday absent from the English Academy.' 'Yes, sir' (gulp). 'And pray, where did you spend the day, George Booth?' 'In Sir John's wood, sir, picking nuts.' 'Humph!'—James Charles Buchmahon interrupted himself in his process of mending the pens, and stared straight forward into poor George's blinking pig's eyes, as if seriously endeavouring to make him out. The conference was resumed. 'Very good. And pray, Mr. George Booth, at whose suggestion did you go to Sir John's wood to pick nuts?' 'At—' (a great gulp—another and another)—at Satan's, sir.' 'At whose?' 'Satan's, sir.' James Charles Buchmahon now laid down the penknife, and placed the pen beside it, and there was another look into George's eyes, and through and through them, until it could almost be seen coming out at the back of his skull. 'Satan's, you say, sir?' 'Yes, sir.' 'Will you be good enough, Mister George Booth, to say also in what manner Satan and you happened to interchange words on the subject?' 'Sir?' 'Where did you meet Satan, Mr. George Booth?' 'I saw him, sir, up'—George became at fault, and swallowed the air more violently than ever. 'Up where, pray?' 'Up—up in the clouds, sir—at the top of Meeting-House Lane,' the lane that led directly from his own street into the country. 'Very good, again, sir. And pray what kind of person is Satan?' 'He's—just—about your size, sir,' and George bobbed his head, as if the confession he had made required something like an apologetic bow, while James Charles Buchmahon deliberately raised his cream-coloured hat from his head, bowed very formally and politely in his turn, and then replaced his beaver. But, oh! even George Booth could comprehend that this excessive politeness boded him no good. 'Well, sir, about my size, you say: will you please to favour me with a more detailed description? Was there any further likeness?' 'No, sir,' George hastened to aver —'No—'pon my word and credit, sir!' 'Well, sir—go on with your description.' 'He was black, sir—and he had horns and the tail, sir—and he had hoofs on him, sir, instead of shoes.' 'I—see. Well, what words did he address to you?' 'George, says he'—(gulp). 'Well, sir?' 'George, says he, don't go to school to the English Academy to-day, says he.' 'Well?' 'But go out to Sir John's wood, says he, and pick nuts, says he—there's the best nuts in the whole country there, says he.' 'Any other conversation between you, sir?' 'No, sir.' During the last part of the catechism, James Charles Buchmahon had advanced a step; and now with one blow the unhappy being was stretched at full length upon the old oaken floor, which shook under him, as he roared like a bull calf. This was, indeed, an unusual proceeding on the part of the systematic master of the English Academy; but it will be recollected that there was no boy in the school of sufficient years or strength to bear George Booth's weight upon his shoulders, so that George might have had the advantage of receiving ideas from the fangs of the cat-o'-nine-

tails; while in the apprehension, or rather in the momentary fancy of James Charles Buchmahon—for to this hour even he has not been able to arrive at certainty upon the point—some punishment became indispensable for George's attempt to enact the mere idiot. And George Booth, from that day to this, through all the progress and changes of advanced life, has remained 'last in his class,' and seems quite satisfied with his position. It is to be added, however, that very, very strange to say, after having become married, and after having swelled into a truly Falstaff shape, George, at the appointment of his wife, has turned schoolmaster himself; for she keeps a seminary, in which children are taught the first rude combinations of their alphabet, and he perhaps feels a reacting pleasure in exercising his latecome power of torturing the poor little animals into a comprehension of a process which he himself could never understand."

It is only necessary for us thus to introduce *Father Connell:* we need not recommend him to the attention of the public, nor express the kindly wish we feel for his and his author's success.

The Mabinogion, from the Llyfr Coch o' Hergest and other ancient Welsh Manuscripts; with an English Translation and Notes. Part IV., containing Kilhwch and Olwen. By Lady Charlotte Guest. 8vo. London, Longman and Co.; Llandovery, Rees.

We have already spoken so frequently, so fully, and in terms of such well-deserved eulogium, of the merits of the curious collection of national tales, for the publication of which the Principality and all lovers of popular literature are indebted to the combined learning, patriotism, and good taste of Lady Charlotte Guest,—that our notice of the tale of *Kilhwch and Olwen* can be little more than an echo of those in which we have from time to time directed the attention of our readers to the high literary value of its predecessors.

The tale of *Kilhwch and Olwen*, though exhibiting all the features by which the preceding Mabinogi have been characterised, is distinguished by certain peculiarities which invest it with considerable interest. It bears within itself indubitable marks of having been written down from the recitation of some professed bard or story-teller; for it so abounds in allusions to other Welsh tales and traditions, as to render it certain that it could not have been composed by one who had not devoted his whole life to the study of the romantic stories and poetical legends of his native country;—while, on the other hand, many of these allusions are so slight and passing, that they not only presuppose on the parts of the hearers a perfect knowledge of the tales to which they refer; but they are poured forth, all imperfect and transient as they are, with a rapidity and vehemence justifiable enough in a bard when, under the influence of the divine afflatus, he charms an excited auditory with his stirring and tuneful rhapsodies; but which are scarcely to be excused in one who having, in lonely vale and lofty mountain, pondered over the high and chivalrous deeds which should form the staple of his narrative, proceeds, in the solitude and stillness of his chamber, to record

"His words that breathe and thoughts that burn"—

not for impassioned crowds of admiring listeners, but for pale and contemplative students, or, worse still, for carping, critical readers.

Some parts of the story of *Kilhwch and Olwen* are, however, very free from this defect—if that may be called a defect which serves to preserve allusion to so many old myths and traditions; and the passage in which Kilhwch, the hero, sets forth in search of his destined bride is one of these:—

"And the youth pricked forth upon a steed with head dappled grey, of four winters old, firm of limb, with shell-formed hoofs, having a bridle of linked gold on his head, and upon him a saddle of costly gold. And in the youth's hand were two spears of silver, sharp, well-tempered, headed with steel, three ells in length, of an edge to wound the wind and cause blood to flow, and swifter than the fall of the dew-drop from the blade of reed-grass upon the earth when the dew of June is at the heaviest. A gold-hilted sword was upon his thigh, the blade of which was of gold, bearing a cross of inlaid gold of the hue of the lightning of heaven; his war-horn was of ivory. Before him were two brindled, white-breasted greyhounds, having strong collars of rubies about their necks, reaching from the shoulder to the ear. And the one that was on the left side bounded across to the right side, and the one on the right to the left, and, like two seaswallows, sported around him. And his courser cast up four sods with his four hoofs, like four swallows in the air, about his head, now above, now below. About him was a four-cornered cloth of purple; and an apple of gold was at each corner, and every one of the apples was of the value of an hundred kine. And there was precious gold of the value of three hundred kine upon his shoes, and upon his stirrups, from his knee to the tip of his toe. And the blade of grass bent not beneath him, so light was his courser's tread as he journeyed towards the gate of Arthur's palace."

This picture how

"The gallant knight came pricking o'er the plain,"

is to our mind a very striking one: not less so are the accounts of his reception at Arthur's court, and his request to that mighty monarch. The porter refuses him admission, and thus states the grounds of his refusal:—

"'The knife is in the meat, and the drink is in the horn, and there is revelry in Arthur's hall; and none may enter therein but the son of a king of a privileged country, or a craftsman bringing his craft,'" &c.

His threats of bringing dishonour upon Arthur induce the porter to report his arrival; to whom the king replies:

"'If walking thou didst enter, return thou running. And every one that beholds the light, and every one that opens and shuts the eye, let him shew him respect, and serve him, some with gold-mounted drinking-horns, others with collops cooked and peppered, until food and drink can be prepared for him. It is unbecoming to keep such a man as thou sayest he is in the wind and in the rain.'"

Having gained admission into the hall, and received the welcome of Arthur, he demands a boon from him. The following passage is highly curious and characteristic:—

"'By the truth of heaven, thou shalt have it cheerfully, name what thou wilt!' 'I would that thou bless my hair.' 'That shall be granted thee.' And Arthur took a golden comb, and scissors, whereof the loops were of silver; and he combed his hair. And Arthur inquired of him who he was; 'For my heart warms unto thee, and I know that thou art come of my blood. Tell me, therefore, who thou art?' 'I will tell thee,' said the youth: 'I am Kilhwch, the son of Kilydd, the son of Prince Kelyddon, by Golenddydd my mother, the daughter of Prince Aulawdd.' 'That is true,' said Arthur: 'thou art my cousin. Whatever boon thou mayest ask, thou shalt receive, be it what it may that thy tongue shall name.' 'Pledge the truth of heaven and the faith of thy kingdom thereof.' 'I pledge it thee gladly.' 'I crave, then, of thee, that thou obtain for me Olwen the daughter of Yspaddaden Penkawr; and this boon I likewise seek at the hand of thy warriors.'"

The following poetical description of the maiden justifies to the fullest the hero's choice:

"The maiden was clothed in a robe of flame-coloured silk, and about her neck was a collar of ruddy gold, on which were precious emeralds and rubies. More yellow was her head than the flower of the broom, and her skin was whiter than the foam of the wave, and fairer were her hands and her fingers than the blossoms of the wood anemone amidst the spray of the meadow fountain. The eye of the trained hawk, the glance of the three-mewed falcon, was not brighter than hers. Her bosom was more snowy than the breast of the white swan. Her cheek was redder than the reddest roses. Whoso beheld her was filled with love. Four white trefoils sprung up wherever she trod: and therefore was she called Olwen."

And with this striking passage we must take our leave of the tale of *Kilhwch and Olwen*—passing over all notice of the difficulties which the Bard, who

"First makes the giants, which he after slays,"

throws in succession before the lover,—difficulties created apparently only for the purpose of being surmounted by the valour and skill of Arthur and his companions; but assuring our readers that, as a curious specimen of national fiction, a faithful record of olden customs, a living picture of ancient manners, the tale will well repay them for the time spent in its perusal; and congratulating the Principality that these 'novels of an age which knew of none' have found an editor in the accomplished lady, who displays, in the execution of her task, an amount of learning and good taste, only to be excelled by the patriotism which induced her to undertake it.

MADAME D'ARBLAY'S DIARY AND LETTERS.

[Second notice: Vol. III.]

Mrs. Warren Hastings was, it seems, a friend of Mrs. Schwellenberg's, and her presentation to the Queen gave rise to one of the most stirring of the tea-party colloquies.

"A very unfortunate subject happened to be started during our tea, viz. the newspaper attacks upon Mrs. Hastings. The colonel, very innocently, said he was very sorry that lady was ever mentioned in the same paragraph with her majesty. Mrs. Schwellenberg indignantly demanded, 'Why?—where?—when? and what?' Unconscious of her great friendship for Mrs. Hastings, the colonel, unfortunately, repeated his concern, adding, 'Nothing has hurt me so much as the queen's being ever named in such company.' The most angry defence was now made; but in so great a storm of displeasure and confusion of language, that the colonel, looking utterly amazed, was unable to understand what was the matter. Major Price and myself were both alarmed; Miss P—— longed to laugh; Miss Mawer sat perfectly motionless; Mr. Fisher decidedly silent. No one else was present. The colonel, whenever he could be heard, still persisted in his assertion, firmly, though gently, explaining the loyalty of his motives. This perseverance increased the storm, which now blew with greater violence, less and less distinct as more fierce.

Broken sentences were all that could be articulated. 'You might not say such thing!'—'Upon my vord!'—'I tell you once!'—'Colonel what-you-call,—I am quite warm!'—'Upon my vord!—I tell you the same!'—'You might not tell me such thing!'—'What for you say all that?' As there was nothing in this that could possibly clear the matter, and the poor colonel only sunk deeper and deeper, by not understanding the nature of his offence, Major Price now endeavoured to interfere; and, as he is a great favourite, he was permitted not only to speak, but to be heard. 'Certainly,' said he, 'those accounts about Mrs. Hastings, and the history of her divorce, are very unpleasant anecdotes in public newspapers; and I am sorry, too, that they should be told in the same paragraph that mentions her being received by the queen.' Nothing could equal the consternation with which this unexpected speech was heard. 'Upon my vord! you sorprise me!' was all that could now be got out. As I found them now only running further from general comprehension, I felt so sorry that poor Mrs. Hastings, whom I believe to be a most injured woman, should so ill be defended, even by her most zealous friend, that I compelled myself to the exertion of coming forward now in her behalf myself; and I therefore said, it was a thousand pities her story should not be more accurately made known: as the mode of a second marriage from a divorce was precisely the contrary here of what it was in Germany; since here it could only take place upon misconduct, and there, I had been told, a divorce from misconduct prohibited a second marriage, which could only be permitted where the divorce was the mere effect of disagreement from dissimilar tempers. Mrs. Hastings therefore, though acquitted of ill-behaviour by the laws of her own country, seemed by those of England convicted; and I could not but much regret that her vindication was not publicly made by this explanation. 'So do I too,' cried Major Price; 'for I never heard this before.' 'Nor I,' cried the colonel; 'and indeed it ought to be made known, both for the sake of Mrs. Hastings, and because she has been received at court, which gave every body the greatest surprise, and me, in my ignorance, the greatest concern, on account of the queen.' This undid all again, though my explanation had just stilled the hurricane; but now it began afresh. 'You might not say that, Colonel Fairly; you might not name the queen!—O, I can't bear it!—I tell you once it is too moch!—What for you tell me that?' 'Ma'am, I—I only said—It is not me, ma'am, but the newspapers—.' 'What for you have such newspapers?—I tell you the same—it is—what you call—I don't like such things!' 'But, ma'am—' 'O, upon my vord, I might tell you once, when you name the queen, it is—what you call—I can't bear it—when it is nobody else, with all my heart!—I might not care for that—but when it is the queen,—I tell you the same, Colonel Fairly—it makes me—what you call—perspire.' The major again interfered, saying it was now all cleared up by the account of the difference of the German customs, and therefore that it was all very well. A certain quiet but yet decisive way, in which he sometimes speaks, was here very successful; and as the lady stopped, the colonel saw all explanation too desperate to aim at further argument."

Another trait of this lady will amuse.

"What a stare was drawn from our new equerry the following evening, by Major Price's gravely asking Mrs. Schwellenberg after the health of her frogs! She answered, they were very well; and the major said, 'You must know, Colonel Gwynn, Mrs. Schwellenberg keeps a pair of frogs.' 'Of frogs? pray what do they feed upon?' 'Flies, sir,' she answered. 'And pray, ma'am, what food have they in winter?' 'Nothing other.' The stare was now still wider. 'But I can make them croak when I will,' she added; 'when I only go so to my snuff-box, knock, knock, knock, they croak all what I please.' 'Very pretty, indeed!' exclaimed Colonel Goldsworthy. 'I thought to have some spawn,' she continued; 'but Lady Maria Carlton, what you call Lady Doncaster, came and frightened them; I was never so angry!' 'I am sorry for that,' cried the major, very seriously; 'for else I should have begged a pair.' 'So you meant, ma'am, to have had a breed of them,' cried Colonel Goldsworthy; 'a breed of young frogs? Vastly clever, indeed!' Then followed a formal enumeration of their virtues and endearing little qualities, which made all laugh except the new equerry, who sat in perfect amaze. Then suddenly she stopped short, and called out, 'There! now I have told you all this, you might tell something to me. I have talked enoff; now you might amuse me.' Major Price, to humour the demand, instantly said he would tell a story; and so he did, and such a story as truly won my surprise at his courage! It was of a Sir Joseph something, who was walking by the side of a pond, and fell plump in, and being well soused, got out again! It diverted, however, so well, that Colonel Goldsworthy was desired to do as much. And so he did, and just in the same style; and, had I not been yet low from Mrs. Delany's continued confinement, I must have laughed at this intrepid absurdity. Poor Colonel Gwynn, expecting the next summons, could not laugh at all; but he was happily relieved by the appearance of the Princess Amelia, who came to order him and Colonel Goldsworthy to attend her to the lower lodge."

The following extract relating to Mrs. Siddons shews that Miss Burney continued to entertain her earlier prejudices against that distinguished tragedian. In 1787 we are told—

"In the afternoon, while I was drinking coffee with Mrs. Schwellenberg—or, rather, looking at it, since I rarely swallow any,—her majesty came into the room, and soon after a little German discourse with Mrs. Schwellenberg, told me Mrs. Siddons had been ordered to the lodge, to read a play, and desired I would receive her in my room. I felt a little queer in the office; I had only seen her twice or thrice, in large assemblies, at Miss Monckton's and at Sir Joshua Reynolds', and never had been introduced to her, nor spoken with her. However, in this dead and tame life I now lead, such an interview was by no means undesirable. I had just got to the bottom of the stairs, when she entered the passage-gallery. I took her into the tea-room, and endeavoured to make amends for former distance and taciturnity, by an open and cheerful reception. I had heard from sundry people (in old days) that she wished to make the acquaintance; but I thought it then one of too conspicuous a sort for the quietness I had so much difficulty to preserve in my ever-increasing connexions. Here all was changed; I received her by the queen's commands, and was perfectly well inclined to reap some pleasure from the meeting. But, now that we came so near, I was much disappointed in my expectations. I know not if my dear Fredy has met with her in private, but I fancy approximation is not highly in her favour. I found her the heroine of a tragedy,—sublime, elevated, and solemn. In face and person truly noble and commanding; in manners, quiet and stiff; in voice deep and dragging; and in conversation formal, sententious, calm, and dry. I expected her to have been all that is interesting; the delicacy and sweetness with which she seizes every opportunity to strike and to captivate upon the stage had persuaded me that her mind was formed with that peculiar susceptibility, which, in different modes, must give equal powers to attract and to delight in common life. But I was very much mistaken. As a stranger, I must have admired her noble appearance and beautiful countenance, and have regretted that nothing in her conversation kept pace with their promise; and, as a celebrated actress, I had still only to do the same. Whether fame and success have spoiled her, or whether she only possesses the skill of representing and embellishing materials with which she is furnished by others, I know not; but still I remain disappointed. She was scarcely seated, and a little general discourse begun, before she told me—all at once—that 'there was no part she had ever so much wished to act as that of Cecilia.' I made some little acknowledgment, and hurried to ask when she had seen Sir Joshua Reynolds, Miss Palmer, and others with whom I knew her acquainted. The play she was to read was 'The Provoked Husband.' She appeared neither alarmed nor elated by her summons, but calmly to look upon it as a thing of course, from her celebrity."

The Turkish Interpreter, &c. By Major Charles Boyd. Pp. 319. Paris and London, Didot Frères; Smith, Elder, and Co.

A good Turkish grammar has become more and more a national desideratum; and we are glad to see it so satisfactorily supplied as in the volume before us. The day, we trust, is not distant, when our political intercourse with the Porte will be carried on through native Englishmen, and not through foreign dragomans, on whose secrecy and fidelity no dependence can be placed.

Hoel the Hostage, and other Poems. By M. E. Jeffreys. 8vo. Lond., Saunders and Otley.

The first of these poems relates an episode in the life of a Welsh prince, a hostage at the court of Henry the Second. The metre is Spenserian, and flows sweetly enough: we have room but for one extract. Speaking of undiscovered love, the author has the following pleasing simile:—

"Nor care we then whilst stooping at the brink
Of that bright fountain whence its waters flow,
So that we unreprov'd may freely drink,
And view reflected in its depths below
Glad thoughts, and pleasant dreams, and things that glow
With tenfold beauty in that mirror seen:
Woe unto them who, curious to know
The source of its enchanted spring, would lean
Unwarily too far across its crystal sheen!"

Of the other poems, the "The Last of the Hohenstauffen" strikes us as the best; it is a spirited account of the execution of Couradin, by Charles of Anjou. With the exception of a few liberties taken with quantity, which make the lines here and there read prosaic, the whole volume is a very creditable *coup d'essai*.

ARTS AND SCIENCES.

PARIS LETTER.

Paris, June 24, 1842.

Academy of Sciences: sittings of June 20.—M. Pelouze communicated a memoir by M. Gay-Lussac on the nature of the bleaching compounds of chlorine. M. Gay-Lussac un-

dertook a series of researches with a view to dissipate the uncertainties resulting from differences of opinions on this subject. He has confirmed the principal facts discovered by M. Balard, and cleared up and added many other important points. The memoir concluded with an experimental and theoretical examination of the mode in which chlorures are formed from the oxides.

M. Vicet read a memoir on the puzzolanas, in which he discussed how far the Romans were acquainted with their origin, constitution, &c. He described the results of his experiments on these substances with respect to their composition, and their combination with lime.

M. Delaporte read a paper on attraction, which power he conceived to be unequally distributed over the solid surface of the earth; his opinion was, that the matter in which this power was inherent was a compressible and dilatable fluid, the movements of which were influenced by the attraction of the stars and the disturbances of the interior of the earth!

M. Morand read a memoir on the general laws of the universe, and their mathematical expression.

M. Dumas presented, in the name of M. Bouchardat, a work on the proximate composition of fibrin, gluten, albumin, and casein. The author concludes that these substances, so different the one from the other in their physical and physiological properties, possess chemical identity in their proximate principles.

M. Duhamel read a note on the accordance of the results obtained experimentally by M. Savart in acoustics with the mathematical formulæ he had reported.

M. Poisson, son of the celebrated geometrician, transmitted a manuscript memoir of his father's on light.

M. Gondret sent a note on the employment of flame for the cure of rheumatism.

MM. Lecomte, Korylsky, Hautcœur, Grandjean, and several others, addressed notes relative to railways.

Versailles Railway (Rivé Gauche). The number of travellers on this line during the second ten days in June amounted to 26,123; the receipts from whom were 29,083f. 10c.

LITERARY AND LEARNED.

ASIATIC SOCIETY.

June 18.—Prof. Wilson in the chair. Another paper of the series "On the mineral resources of Southern India," by Lieut. Newbold, was read: it was on the diamond-mines. These mines occur in irregular patches over the great plain bordering the larger rivers flowing into the Bay of Bengal, between 15° and 25° of latitude. The first noticed were those of the ceded districts, which originally formed part of the empire of Golconda, celebrated for its diamonds throughout the world. The principal place visited was Condapetta, a small village not far from Pennaur river. The hills in this part never rise more than a thousand feet above the adjacent plain, which has an elevation of five hundred feet from the sea; they are of sandstone passing into arenaceous and argillaceous slates. The mines are about a mile from the river. A curious instance of the superstition of the natives was exhibited on the approach of Lieut. Newbold. He was accosted by a Brahman, who earnestly entreated him to leave his horse behind, as his presence might offend the tutelary deities of the mines, in whose honour a mystic rite was then performing. Lieut. Newbold remarked that once before he had found the same belief in Malacca, in consequence of which he had been obliged to leave his horse, and to walk for some distance through a muddy jungle in his way to visit a tin-mine. He was in time to view the mystic ceremony. The new excavation was marked out; divining rods were fixed in the ground; stones smeared with red and yellow paint were deposited in holes dug to receive them; and burning incense perfumed the air. Some complex astrological computation had determined the propitious day and moment; a sacrifice was made to Lakshmi, the goddess of good luck; and the excavation was begun. The old excavations were very numerous; they covered a space of more than a square mile, surrounded by heaps of stone and gravel. The stratum cut through is of cotton soil from three to ten feet thick, resting on a bed of rolled stones, mingled with mud and gravel. The diamonds are found among these stones, generally loose, but sometimes adherent. The process of mining consists merely in digging out the stone and gravel, washing these in reservoirs paved with flat stones; and then spreading them out carefully for examination: the diamonds are then found by their peculiar lustre. All the diamonds produced formerly were carried for sale to Golconda. In those days large diamonds were found, which has rarely been the case since the British ascendancy in India. This falling off in size is attributed by the natives to the displeasure of the tutelary divinities; but Lieut. Newbold is rather inclined to suspect that as one-third of the value of all diamonds above a gold pagoda (about fifty-three grains) in weight, was paid to the government, the interest of the native chiefs induced them to look more closely after large diamonds than is now the case.

The next mines visited were those of Banaganpully, where the process is similar to that above described, except that the excavation is conducted through a harder and more difficult ground. Few diamonds are found here; and the profits scarcely cover the expenses. The same may be said of the mines of Manimadgu, near Paspulah.

The mines of Ramulcota, in the Kurnool district, are said to contain very fine diamonds; but the expense of blasting the rock being great, the contractors generally confine themselves to the detritus, where the common sorts are found, which by their accessibility afford a better profit. The process is the same as has been before described. Lieut. Newbold found only twenty persons at work; but in the dry season 500 are assembled. The imperfect means of drainage the natives can command prevents operations being carried on during the rains.

Lieut. Newbold mentions the universal belief among the miners of India that diamonds grow; that worn-out excavations, after a lapse of rest of fifteen or twenty years, may again be examined, and fresh diamonds will be found in them. Although at first little disposed to pay any attention to such a belief, Lieut. Newbold subsequently saw reason to consider it more fully; and he is now of opinion that the belief is not without foundation. He has generally found that the opinions of the natives on these matters are in the main correct; and has himself witnessed the extraction of diamonds in tolerable abundance from excavations long neglected as worn out. At many mines the natives content themselves with working the old excavations in succession, which they constantly find profitable after a sufficient lapse of time, although abandoned before as unproductive. The small size of diamonds in modern times may, perhaps, be accounted for on this hypothesis, the cupidity of the contractors not allowing a sufficient interval of rest to intervene between the workings.

Diamonds are divided by the Hindus into four castes, to which they give the names of their own civil distinctions; the best diamond being called a Brahman, and the lowest a Sudra. The largest recently found was dug up at Punnah, and it was sold for 400*l*. The art of polishing these gems appears to have been known and commonly practised in India for many ages, although scarcely known in Europe till about four centuries ago. Modern discoveries also seem to prove that the art was practised by the ancient Egyptians.

The meetings were adjourned till November.

FINE ARTS.

OXFORD ARCHITECTURAL SOCIETY.

The third annual meeting was held June 6th.—A portfolio of 83 original sketches and drawings of Gothic buildings and details, intended as a continuation of Mr. Rickman's drawings, by W. Grey, Esq.; coloured tracings of Gothic tiles from Shottisbrooke Church, Berks, and St. Stephen's Chapel, Westminster, by J. Clarke, Esq.,—were among the presents.

The chairman read a report of the proceedings of the society during the year, and an address on its progress and prospects; observing that there is much ground for congratulation on the continued interest felt in all parts of the country in promoting the objects for which this society was founded—the taste for and study of Gothic architecture. Kindred institutions had been formed in the important towns of Exeter, Bristol, and Lichfield, and in the University of Durham, supported by the rank and talent of their respective neighbourhoods; and a fuller appreciation of the beauties of Gothic architecture is rapidly gaining ground; the same feeling seems to pervade all Europe. Efforts are now making in the principal cities of the Continent to raise funds for completing the magnificent cathedral of Cologne; this should be truly an European undertaking, and would do honour to the age which attempts it. Of the proceedings of the society perhaps the most important may be considered to be, the furnishing a design for a Gothic cathedral at St. John's, Newfoundland, at the request of the bishop; and casts from Iffley church, to the Bishop of New Zealand, supplied at his request, to serve as working-models for the ornaments of his proposed cathedral, for which the design was furnished by the Cambridge Camden Society. The acquisition of the drawings of the late Mr. Rickman should be mentioned as a matter of congratulation to the society; the number and variety of examples which they supply cannot fail to be useful to the members, while the imperfect state in which some divisions are left will serve only as a stimulus to complete them.

The Master of University College then favoured the meeting with a very interesting lecture on the history of the art of staining and painting on glass, for the decoration of ecclesiastical buildings. He observed, that the popular notion, that the art of making particular colours, such as the ruby, is lost, is erroneous; and that the chief thing which the art of glass-staining or painting now requires to make it equal to the ancient examples, is a better taste and more extensive patronage on the part of the public. [We doubt this: there is a distinct epoch in which the art reached its climax.—*Ed. L. G.*]—*From the Oxford Herald.*

NEW PUBLICATIONS.

Portrait of J. Orchard Halliwell. On stone by W. L. Walton. London, J. R. Smith.

A GOOD likeness of this young author, who, though so young, has already distinguished himself in many walks of literature and science, so as to give promise of a future of high reputation and fame.

Portrait of the Right Hon. C. Kendal Bushe, Lord Chief-Justice, &c., Ireland. Painted by W. Stevenson; engraved by D. Lucas.

WE are not able to judge of this likeness; but we can speak to the design, as being the representation of a fine aged man, with a high forehead and thoughtful expression.

The Exhibition-Catalogue of the Royal Academy, &c. &c. Pp. 40. Double columns. London, E. Smith, Strange.

A COLLECTION of the remarks of many of the daily and weekly journals on the present exhibition, in which the various conflicting and contradictory opinions of the critics are placed in a ludicrous light; one calling black what another calls white. No doubt a number of these direct contradictions are very ludicrous; but, when we reflect who and what the majority of the critics are, there is nothing wonderful in their opposed ignorance and nonsense. In many instances too, it may be observed, that even competent judges may express very different opinions on the same subject, as they happen to take different views of it,—one looking chiefly to the invention, another to the composition, a third to the colouring, and others to other qualities of art—some pointing out what is praiseworthy, some pointing out the defects. These only appear to differ, and may cordially agree. The gross absurdities occur when the writers speak of distinct facts about which there can be no uncertainty; and in this respect the pamphlet of comparative criticisms is laughable enough, whilst it proves to demonstration, that the mass of newspaper-directors of the public taste are indeed but wooden gods.

BIOGRAPHY.

FREDERICK H. YATES.

ANOTHER great popular favourite has, alas! fallen from our sphere of dramatic talent and innocent mirth. Poor Frederick Yates, after a long indisposition, and latterly a severe illness from the rupture of a second blood-vessel, departed this life on Tuesday week at the early age of forty-five. The Adelphi, whose mimic imitations and personations were unrivalled, the Mathews and the Yates, both are gone. In many characters, not alone of comic humour or of pathos, but partaking of almost every variety of theatrical exhibition and spirit, and, in short, embracing a wide range of comedy and tragedy, Mr. Yates displayed a degree of skill, versatility, and genius, such as few, if any, of his contemporaries could reach. But our brief notice (written in haste, among pressing avocations) must rather lament his individual loss than comment on his public performances. His early career was passed in the society of gentlemen, and their manners and principles of honour became portion of his nature in all his private intercourse and concerns. His marriage with Miss Burnton (one of the most amiable and accomplished women of our day) had also a powerful influence upon his life; amid the coil and struggle of an actor's and a manager's perpetual effort, and no less perpetual warfare, softening all their asperities into the enjoyment of domestic affection and he sweet amenities of a happy home. Of late years, we believe, Mr. Yates has been of sincerely religious disposition and habits, which must now be a source of no small comfort to his bereaved partner, and only son, to whom she, in the midst of her own afflictions, may have the grateful maternal duty of communicating this mighty consolation.

SKETCHES OF SOCIETY.

British Association Notes and Varieties.

[It may lighten the burden of scientific statements a little to pick out a few accompanying notes, observations, anecdotes, and facetiæ.]

Buonaparte's Horse.—The stuffed skin of Buonaparte's horse *Vizier*, a small grey charger on which he is represented in pictures (but looking sadly different to the artist's fiery steed), is in the gallery of the Natural History Museum (the meeting-place of Sect. D), and the stuffed skin of a zebra beside it, to shew its comparative size. An announcement, put up near the gallery, states that Napoleon's *horse* is to be seen by all the members of the *Brit. Ass.*

In a case in the adjacent gallery is a Roebuck to be seen by members, and close to the committee-room; just as we read of the same animal, politically, in the close committee-room in London.

Lord F. Egerton in speaking has caught a curious habit of very frequently raising his right hand to his nose, and giving that organ a rub with the forefinger. Upon this a pseudo-wit present wrote the following impromptu:—

A MODERN MIRACLE:
In action: performed by the President of the British Association, at Manchester, 1842.

Like Saint Francis, Lord Francis a miracle shews;
The speech out of his Mouth, he rubs out of his Nose!

His lordship's speeches, first and last, were admirable; but the nasal application reminded us of Scott's story of the boy with the button. If his lordship had no nose to draw on, it seems to us that he would be in the predicament of that youth, whose button the wicked Scott cut off, and so confused him when the questions at school were asked and he had no familiar to twiddle with, that he lost all recollection of answer; and his wily contemporary pushed him down from *Dux*, and took his place.

But, in fact, we have ourselves almost acquired the Egertonian custom, during only a week in this lovely atmosphere of smoke. In the humility of our downward looks (*vide* Mr. Braid hereafter) we have so often detected streaks of black upon that prominent feature, that the fingers have been up and at them, till we do it whether they are there or no . . . se.

Mr. Dent, the celebrated chronometer-maker,—the perfection of some of whose improvements in clock-work is recorded in our sectional reports,—has been accidentally located, or lodged, in *Lever* Street,—the only street in Manchester, almost, without a London street name,—such as Piccadilly, Pall Mall, Spring-Gardens, &c. &c.

The Anti-Corn-law League are wondrous busy with placards on boards near the section-doors, advising the members to buy and distribute *their* tracts. We have not observed many running to the depôt; for, in fact, most of the members are thinking and acting about projects of their own.

Other placards, of which there are always a great variety to attract notice on these occasions, were droll enough: *ex. gr.*

One for a meeting on smoke; a second for a committee to sit on the mud of rivers; another announcing the exhibition of Dubufe's painting of Adam and Eve, the portraits original, as a Manchester wonder-monger declared in our hearing; and another stating that the Eruption (not a Chartist) was postponed, in consequence of some accident which had happened to the machinery. Something like the French lady desiring the eclipse to be put off for an hour or two, to suit her conveniency in attending at the observatory.

And talking of eclipses puts us in mind of the famous astronomer *Bessel*, whose presence glorified this meeting of the Association, where he was a fixed star, without a *parallel* (pity that *parallax* has not the same meaning!) during the whole week. M. Bessel is a singular-looking person, with his eyes sunk deep in his head, and overhung with a pent-house brow, as if created on purpose to discover the secrets of the skies far beyond the ken of other human beings. His grey hairs, a "sable silvered," give him the appearance of greater age than the reality, under sixty, and when brought into close *tête-à-tête* with Herschel, it was curious to see the two so nearly of the same colour in conjunction. M. Bessel was brought up to trade, and, we were informed, was between twenty and thirty years of age before his resistless love of astronomy was developed and displayed to the world.

M. Jacobi is one of the most eminent mathematicians in Europe, and professor of mathematics in the university of Heidelberg. His works are written in Latin, and his *magnum opus* thus entitled, "*Fundamenta Novæ Theoriæ Functionarum Ellipticarum.*" The professor, whom we had the pleasure to meet in private society, speaks English a little, but understands it well, and is an enthusiastic admirer of Shakspere. Except to those deep in mathematic lore, it may be unknown, that Legendre, the famous French author, had spent forty years of his life, and published two huge volumes, on the functions of which Jacobi, by a happy theorem, since called by his name, elucidated the laws; whilst, contemporaneously, another young man, M. Abel, of Christiansandt, who died prematurely at the early age of 24 or 25, without communication or intercourse with him, by another equally important theorem, soared to the utmost heights of mathematical science! Thus had Legendre, when nearly fourscore, to add to all his valuable labours (which he did in an additional volume,) the fortunate and splendid triumphs snatched, as it were in a moment of intuition, by his youthful compeers. In social intercourse, M. Jacobi (whose lady accompanies him) is a very agreeable companion, and full of interesting matter, both scientific and literary.

The venerable Dalton was at Manchester the lauded local lion of the place; as the great engineer Watt (though dead) was at the Glasgow meeting; and he was sedulously attended throughout by Peter Clare, who truly seemed the Boswell to this Johnson. When the toast of the Literary and Scientific Societies of Manchester and Dr. Dalton was drunk at the grand dinner, and Peter rose to return thanks for his friend, one of the company exclaimed,

O Clare et venerabile nomen!

which a *rum* manufacturing critic declared to be bad Latin.

The chief collision of the week was peculiarly hard on Peter Clare, whose assiduity contributed so much to its going off well with every body else; but it so happened that Mr. Braid, the *Neurohypnologist*, who resides here, sent to the Medical Section a paper on his discoveries in this new philosophy, which was certainly most ungraciously and discourteously sent back to him by a common porter, unsealed, and indorsed on the outside, "Returned as unsuit-

able." Now, though Mr. Braid can set all his patients to sleep by merely turning up their eyes, he turned up his own on this affront without inducing somnolency, and seemed determined to keep Peter Clare, *inter alia*, wide awake with his complaints at the indignity. Poor Peter was sadly baited; and it was melancholy to hear him, in the midst of his busy business from section to section, with a bundle of remonstrances in his hands, and humming as he went along,

"Should he up-Braid!"

We went to witness Mr. Braid's experiments, and shall speak of them in a future *Gazette*: they enter fairly into the field with Mesmerism.

To conclude for the present, and leave all the Sections till next Saturday, we shall mention a curious provincialism not inapplicable to the occasion:—When a Manchesterian wants to say that he will utterly and out-and-out beat a competitor into "immortal smash," he exclaims,

"I'll mill thee above a Section!"

VARIETIES.

Wilkie Statue.—To-day the determination of the committee will decide to what sculptor the execution of the Wilkie statue is to be confided.

Greenwich Painted Hall and Chapel.—We rejoice to learn that Sir R. Stopford, the governor, has attended to the recommendation of the Select Committee on National Monuments, of 1841, of which Mr. Hume was chairman, to admit the public *free* on two days in the week to view the Painted Hall and Chapel, viz. on Mondays and Fridays, from 10 to 7 o'clock in summer, and from 10 to 3 o'clock in winter; and we trust the public will shew by their conduct a just value of the boon thus given them, which will place Greenwich Hospital on the same liberal footing as the National Gallery and Hampton Court are now placed. We view the conduct of Sir Robert Stopford as highly honourable to him as a gentleman and a sailor; and we trust his example will be followed by those who have charge of public buildings and collections of the works of art that would be invaluable to the mass of the people, as a means of education and acquiring a knowledge of the fine arts, which tend to soften the ruder manners of the ignorant.

The Lawrence Collection of Drawings by Raffaelle and Michael Angelo will at length be added to the works of art at Oxford. The purchase has been effected in consequence of the munificent additional subscription of 4000*l.* by the Earl of Eldon, and by a reduction of 3000*l.* by Messrs. Woodburn from the original price.

Medical Prize.—The committee of the Royal Humane Society have offered a prize gold medal of thirty guineas for the best, and a silver medal, or fifteen guineas, for the second-best essay on the subject of suspended animation, and the best means of restoring life, as well as the best apparatus to be used for that purpose. —*Medical Times.*

Public Monuments.—An interesting notice of public monuments occurred in the House of Commons on Thursday week. In answer to a question by Mr. Prothero, Lord Lincoln stated that the terrace in front of the National Gallery was nearly completed, and might be opened at any time, but that it was not desirable to do so till the Nelson Column had made farther progress. His lordship could not tell whether there were a deficiency in the fund to complete it—(we believe there is)—and left it to the Chancellor of the Exchequer to say whether or not Government would in that case make any advance. But the Chancellor professed ignorance of the state of the funds; and Sir R. Peel significantly expressed a hope that those who had the management of the Monument should "seriously consider the responsibility they were incurring, and ascertain whether the funds subscribed were sufficient for the object in view."

International Copyright.—A very important meeting on this subject was held at the Freemasons' Tavern on Thursday; Mr. Longman of Paternoster Row in the chair. The company was addressed by Mr. G. P. R. James, Mr. Horace Smith, Lord W. Lennox, Sir Charles Morgan, Mr. John Dickenson, Mr. Colburn, Mr. T. Longman, Mr. Blackwood, Dr. A. T. Thomson, Mr. J. Simpson from Scotland, Mr. A. Spottiswoode, Mr. Britton, Mr. Poole, and Mr. T. Hood, in moving resolutions of great interest to authors, publishers, and the nation at large. We regret that an enforced absence from town prevented us from accepting the invitation to attend; but the matter shall not be neglected in our hands, in future numbers of our Journal.

The following is the list of the Committee of Recommendations, in which body much of the power and influence of the Association resides:

Section A.	The Dean of Ely. Sir D. Brewster. Prof. Wheatstone. The Rev. Dr. Lloyd.
Section B.	Prof. Graham. The Marquis of Northampton. The Rev. W. V. Harcourt.
Section C.	Sir H. T. de la Beche. Rev. Dr. Buckland. R. Hutton, Esq.
Section D.	Dr. Richardson. The Dean of Manchester. H. E. Strickland, Esq.
Section E.	Dr. Holme. Dr. James Lomax Bardsley. Dr. Lyon.
Section F.	G. W. Wood, Esq. M.P. Colonel Sykes. H. Hallam, Esq.
Section G.	Rev. Prof. Willis. Rev. Prof. Moseley. Sir John Robison.

Scientific Congress in Italy.—The fourth of these meetings, in 1843, is appointed to take place at Padua, on the 15th September.

Antiquities of Central America.—A number of specimens of the antiquities of Central America, collected by Mr. Norman in Yucatan, are described in the *New Orleans Bee*, May 2d. Mr. Norman travelled in the interior of the country, and sojourned several days at Tchechuan, and other places never visited by Stephens and Catherwood, and abounding in the most interesting relics of an aboriginal race, as well as in monuments yet undecayed by time, and attesting a people far advanced in civilisation. The samples of statuary, sculpture, and hieroglyphical engraving, are of the most surprising character. They are uniformly executed upon an extremely hard stone, and in a country where not a trace of iron has been discovered. Mr. Norman's designs of the great temple at Tchechuan, 400 feet in length, and of a variety of mounds and monuments which he discovered almost concealed by masses of tangled and exuberant vegetation, are fraught with the deepest interest to the antiquarian and inquirer.

Singular Naval Operation.—The Penelope frigate, of 46 guns, was taken into dock, at Chatham, last week, and on Saturday the process of removing one half of the ship from the other was performed in the presence of upwards of 1000 persons. The sight was novel and astonishing. Three ropes were fastened to the gunwale of the ship from three capstans, which were fixed in the ground facing the dock, and which were worked up by windlasses by nearly 200 convicts. As soon as the parts were observed to separate, the band of the dockyard struck up, "Oh dear, what can the matter be?" amidst the cheers of the assembled multitude. The fore-part of the vessel was observed easily to glide up the dock. The fore-part of the ship having been brought up to the mark allotted, left a space between the two parts of the ship exactly 62 feet, which will lengthen her to about 190 feet. She is to have in her two engines of 650-horse power, and to have engine-room for 600 tons of fuel; complete stowage under hatches for 1000 troops, with four months' stores and provisions, exclusive of a crew of about 450 men, and is to be armed with 20 guns of the heaviest calibre, besides carronades. The Penelope, when complete, will be the finest war-steamer in the service.—*Hampshire Telegraph.*

German Opera.—M. Staudigl has taken the German Opera in hand, and all its responsibilities; from which Mr. Bunn, we understand, has withdrawn.

Mr. Wilson's Musical Soirées.—These entertainments, which have deservedly had a rare success, and been daily and nightly crowded, were brought to end for the season on Thursday evening in Store Street. Mr. Wilson, in bidding his audience farewell till next year, observed, that what he had begun with the intention of doing for three nights had extended to twenty-nine; till many of their faces were perfectly familiar to him. Thus encouraged, he hoped to see them again and again when he renewed his performances. He was greatly applauded.

Sad Theatrical Accident.—During a performance at Schleitz, in Germany, for the benefit of the sufferers in Hamburg, the roof of a temporary theatre fell in, and, it is stated, killed above sixty persons, and wounded many more, among whom was the mother of the Prince of Reuss-Schleitz.

The Solar Eclipse of July 7, 1842.—The total eclipse of the sun, which will take place on the 7th of July, 1842, is exciting much attention among the scientific, not only in England and on the Continent, but in America. Thus, in the Royal Astronomical Society's notice for the last month, there appears a paper by Lieut. W. S. Stratford, R.A. on the path of the moon's shadow over the southern part of France, the north of Italy, and part of Germany, during the eclipse. "To induce travellers and others in those countries to prepare for the observation of the important phenomena," Lieut. Stratford furnishes a table "computed to enable them to trace the path of the moon's shadow on a large scale, and with very considerable accuracy." Lieut. Stratford, after various details, observes, should the darkness be sufficiently intense, as has been sometimes the case during the total eclipse of the sun, to render some of the planets and brighter stars visible, the planet Mercury may be looked for about five degrees south of the sun and moon. The planet Mars about west by north; Mars being 15 min. of right ascension to the west, and 1 deg. 16 sec. of declination to the north of the sun and moon, &c. The sun and moon will be in the constellation Gemini, and will have Castor and Pollux not far distant in a N.N.E. direction, &c. Professor Silliman's *Journal of Science and Arts* says, "it is earnestly hoped that particular attention will be paid by those favourably situated, and in possession of suitable instruments, to the determination of the correctness of a recent suggestion—that the irregularities so frequently noticed at the second and third contacts of nearly central eclipses, and at all the contacts of

the transits of Venus, may be seen or not, at the pleasure of the observer, according as the colour of the dark glass he applies to his telescope is red or green." The committee of the Philosophical Society of Philadelphia, in their report on this eclipse, say, "This suggestion is one of the greatest importance, as it seems to furnish evidence of the existence of a lunar atmosphere, through which, as through our own, the red rays have the greatest penetrative power. It also leads to new views concerning the cause of the remarkable appearances of the beads of light and the dark lines frequently noticed, since it shews that their appearance may be completely modified by a change in the colour, and consequently in the absorbing power, of the screen-glass through which they are observed." "It is believed," the professor further remarks, "that, on another account, will this suggestion, if well founded, be of great importance, viz. in its obvious tendency to diminish, if not wholly remove, the discordances not unfrequently found in the best observations on solar eclipses and transits of Venus, and which, with regard to the latter, in 1761 and 1769, were so great as materially to diminish the value of this method of determining the distance between the earth and the sun." There then follow descriptions of the phases of the eclipse at some of the principal cities of Europe.—*Times.*

The Earthquake at St. Domingo.—A letter from Captain Franklin of the West-India steamer Tweed states, that while at least in three hundred fathoms water, the shock was felt as if the vessel had run aground. The distance from the land was twelve or fourteen miles. How great must have been the convulsion!

Indian News.

Akhbar Khan
Was a very bold man,
But when *put up* to Sale
They *knocked down* a bad lot;
And away he ran,
The bold Akhbar Khan,
To tell the tale, of the hammer of Sale,
And whether Akhbar Khan, or can Nott.

TEUTHA.

LITERARY NOVELTIES.

In the *United Service Magazine* for this month, under the head of "The Editor's Portfolio," we read the following address with some painful emotions:—"*To the Members of the United Service.*—I address you for the first time in my individual, and for the last in my editorial, capacity. For fourteen years nearly I have assiduously laboured to render this work, created under my hands, a becoming organ and record of your concerns and deeds; if I have succeeded to an extent at all commensurate with my wishes, it is almost more — considering the variety of classes composing the United Service, and the conflicting interests to be consulted, as well as the public difficulties of the period through which our bark from its launch has been steered—than I could have ventured to hope. In discharging my task I have sought chiefly to cement the union of the services, to establish their claims, interpret their wants, throw light on their duties, and improve their organisation — in promoting professional discussion to preserve it from personal asperity, and cause a publication addressed to a profession of gentlemen to harmonise with the habits of its constituents — to inculcate discipline and loyalty without forfeiture of independence—to cater as well for your instruction as entertainment, blending both where possible or consistent—to provide you with information regarding foreign services, and give durable currency, both abroad and at home, to the intelligence and achievements of our own:—of these efforts you have proofs in 40 volumes of this Magazine. I now voluntarily retire from a charge which has been so long my familiar, though anxious, occupation, that I should feel loath to relinquish it, but for the paramount consideration of health needing repair and relaxation, and other claims on my attention. Let me, however, as one parting kindly from an old companion, bespeak your continued favour and support for a publication so long deemed worthy of your patronage, and which, I am confident, will continue to deserve it: though released from its management, I still hope to assist its objects.

"T. H. SHADWELL CLERKE, Major."

To witness the retirement of a gentleman not only of great information and talent, but eminently gifted with those qualities which do honour to the periodical press, must ever be to us a subject of regret; and it is the greater in this instance from the cause assigned. It will be difficult to obtain a successor to Major Clerke; but his spirit and good offices remain to compensate in some degree for his loss.—*Ed. L. G.*

LIST OF NEW BOOKS.

The Biographical Dictionary of the Society for the Diffusion of Useful Knowledge, Vol. I., Part 1, 8vo, 12*s.*—Swinbourne's Farmer's Field Register-Book. For fifty fields, folio, 7*s. 6d.*; for thirty fields, 5*s.*—Physic and Physicians, new edit. 1 vol. post 8vo, 12*s.*—Page's Decorator and Mechanic's Assistant, oblong 8vo, 5*s. 6d.*—The Teacher's Farewell, a Parting Gift, 18mo, 2*s.*—Apostolical Independency, by J. S. Bright, fcp. 2*s.*—Pictures of Popular People, by the Author of "Random Recollections," royal 8vo, 6*s. 6d.*—A General Armoury of England, Scotland, and Ireland, by J. Burke and J. B. Burke, royal 8vo, 2*l.* 2*s.*—S. W. Tilke on the Nature and Treatment of Disease, 4th edit. 8vo, 10*s.*—The Property and Income-Tax Act, with Index, by M. L. Wells, 12mo, 3*s.*—A Few Days' Stroll about Paris, 18mo, 1*s. 6d.*—Bizarre Fables, by Arthur Wallbridge, 12mo, 4*s. 6d.*—A Shilling's Worth of Nonsense, by the Editors of "Punch," 12mo, 2*s. 6d.*—Bibliotheca Grenvilliana; or, Bibliographical Notices of rare and curious Books, forming part of the Library of the Right Hon. T. Grenville, by J. T. Payne and H. Foss, 2 vols. 8vo, 3*l.* 3*s.*—Consecrated Thoughts; or, a Few Notes from a Christian Harp, by William Harrison, fcp. 2*s. 6d.*—Peregrine Bunce; or, Settled at Last, by Theodore Hook, 3 vols. post 8vo, 1*l.* 11*s. 6d.*—Memoirs of the Right Hon. Sir Robert Peel, Bart. 2 vols. post 8vo, 1*l.* 1*s.*—The Christian Pilgrim, a Poem of Palestine, by E. Peel, 12mo, 7*s. 6d.*—Elementary Properties of the Ellipse, by the Duke of Somerset, 8vo, 9*s. 6d.*—Charles Knight's Library Edition of Shakspere, Vol. IV., 8vo, 10*s.*—The Pictorial History of England, George III., Vol. II., 20*s.*—Esther and her People, ten Sermons, by the Rev. J. Hughes, 2*s. 6d.*—Griffin's Works, Vol. VI.: The Duke of Monmouth, fcp. 6*s.*—The Income-Tax Act, with Introduction and Index, by J. Paget, 12mo, 4*s.*

TO CORRESPONDENTS.

☞ We this week increase the size of the *Gazette*, in order to afford space for the very various, and in many respects important, Report of the British Association, without encroaching too far on our general literary and other matter. Our readers will observe that we have departed from the order of time in respect to two papers on account of their novelty and great value — we allude to the Report of Sir John Herschel and Col. Sabine on the interesting meteorological experiments now being carried on over the habitable (and partly the uninhabitable) earth; and the striking account given by M. Bessel of M. Moser's wonderful discovery. Altogether we trust, that even our young and our female friends will find in our account of the meeting entertainment, as well as instruction, to attract their attention, instead of fancying it a long and dry scientific disquisition.

Many correspondents will pardon any delay in our replies to them in consequence of the employment of a considerable Section of our Staff at Manchester.

To the Editor of the Literary Gazette.

5 Cloudesly Terrace, Islington, June 23, 1842.

On the probability that Heat at redness contains an appreciable amount of Oxygen, and that Light contains Hydrogen.

SIR,—The experiments by which it is assumed as probable that a red heat contains oxygen were made by enclosing bright iron, steel, or copper wire in well-luted crucibles filled with sand (dried), enclosed in others equally well-luted, interstices being filled with sand, and over the lute a fusible mixture, which covered the whole with a glass. On being kept at redness three hours, the wires were, in six or eight different experiments, found oxidised, having perceptibly increased in weight when examined by a balance that turned (unloaded) at the 1-200th grain. If these experiments do not prove that heat at redness contains oxygen, they shew at least that it is more difficult to exclude air completely than is commonly supposed by chemists. The experiments by which it appeared probable that light contained hydrogen, are based on its peculiar action on the compounds of chlorine; its admitted power of de-oxigenating, wholly or partially, the oxides and salts of the noble metals, as they are called, and also the green parts of plants. Having arranged to go on the Continent for a few months, I prefer at present only stating the general results of two very long papers.—I am, &c. HOR. PRATER.

Mr. Hering's address is in Newman Street, Oxford Street.

We have not the means of answering X X Y; and it would be improper to give the information, if we possessed it.

ERRATUM.—In our last week's report, Mr. Faraday should have been mentioned as the representative (with Sir J. Herschel) of Modena, *not* Medina.

LITERATURE AND ART.

BOOKS IN THE PRESS.

BOOKS PUBLISHED THIS DAY.

Printed by Charles Robson, *of Mada Cottage, Cowley Road, North Brixton,* George Levey, *of Number* 1 *Clarendon Terrace, Camberwell New Road, both in the County of Surrey,* and Francis Burdett Franklyn, *of Paradise Row, Stoke Newington, in the County of Middlesex, Printers, at their Printing Office, Great New Street, Fetter Lane, in the City of London: and published by* William Armiger Scripps, *of Number* 13 *South Molton Street, in the Parish of Saint George, Hanover Square, in the County of Middlesex, at the* Literary Gazette Office, *Number* 7 *Wellington Street, Waterloo Bridge, Strand, in the said County, on Saturday, July* 2, 1842.

Agents for New York,—Wiley and Putnam, 151 *Broadway.*